MAY 28 1943

the OIL AND GAS JOURNAL

HUGHES ANSWERS THE CALL FOR ARMS

When the program calling for unprecedented quantities of planes, tanks, ships, trucks, etc., was outlined, it was evident that the oil to operate these vehicles of war would be just as essential as the vehicles themselves. Inasmuch as we were wholly engaged in the manufacture of indispensable tools for the oil producing industry, we were already an important cog in this emergency program.

The task before us, therefore, was to continue furnishing these tools and to devote whatever additional capacity we had or could develop to other vital war production.

Military regulations prohibit publication of complete information on war production, but this we can say:

We are operating four plants. Two are of company ownership, two of government ownership.

Our main plant is producing large quantities of items for the Army, the Navy, the Maritime Commission, and other war agencies—this in addition to the production of Rock Bits, Core Bits, Tool Joints, Valves, and other tools essential to the operation of the Petroleum Industry.

Of the two government owned plants, Hughes Tool Company designed and built the Hughes Aircraft Strut Division, and acted in a consulting capacity in the design and construction of the Dickson Gun Plant. We also furnished the entire executive and operating personnel for both plants. The entire production of these two plants, both of which are now in operation, goes to the Army Air Forces and to the Army Ordnance Department.

Our California plant (operated under the name of Hughes Aircraft Co.) is also completely devoted to war work, the major item now being the design and construction of large cargo planes.

Like other branches of industry, we have had our problems over machine tools, materials, technical procedures, and skilled labor. As we have solved these problems in the past, we expect to solve new ones as they arise.

We pledge our facilities and our manufacturing skill to the fulfillment of the emergency program—and we hope that our broader experience will enable us to render the Petroleum Industry still greater service after the Victory is won.

HUGHES TOOL COMPANY

Houston Texas

Senior Organization in Men and Management for

HUGHES AIRCRAFT STRUT DIVISION — DICKSON GUN PLANT — HUGHES AIRCRAFT CO.

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the OIL AND GAS JOURNAL

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G.S.I.

GEOPHYSICAL SERVICE INC.

DALLAS, TEXAS

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States — Page 98

CRUDE PRODUCTION 3,996,700 bbl. daily average—down 17,285 bbl. One year ago 3,620,325 bbl.

CRUDE STOCKS* 241,457,000 bbl. as of May 15—down 399,000 bbl. One year ago 254,202,000 bbl.

GASOLINE STOCKS 86,950,000 bbl. as of May 15—down 1,216,000 bbl. On year ago 100,780,000 bbl.

RESIDUAL FUEL-OIL STOCKS 67,311,000 bbl. as of May 15—down 266,000. One year ago 79,593,000 bbl.

GAS OIL AND DISTILLATES 31,891,000 bbl. as of May 15—up 228,000. One year ago 29,110,000 bbl.

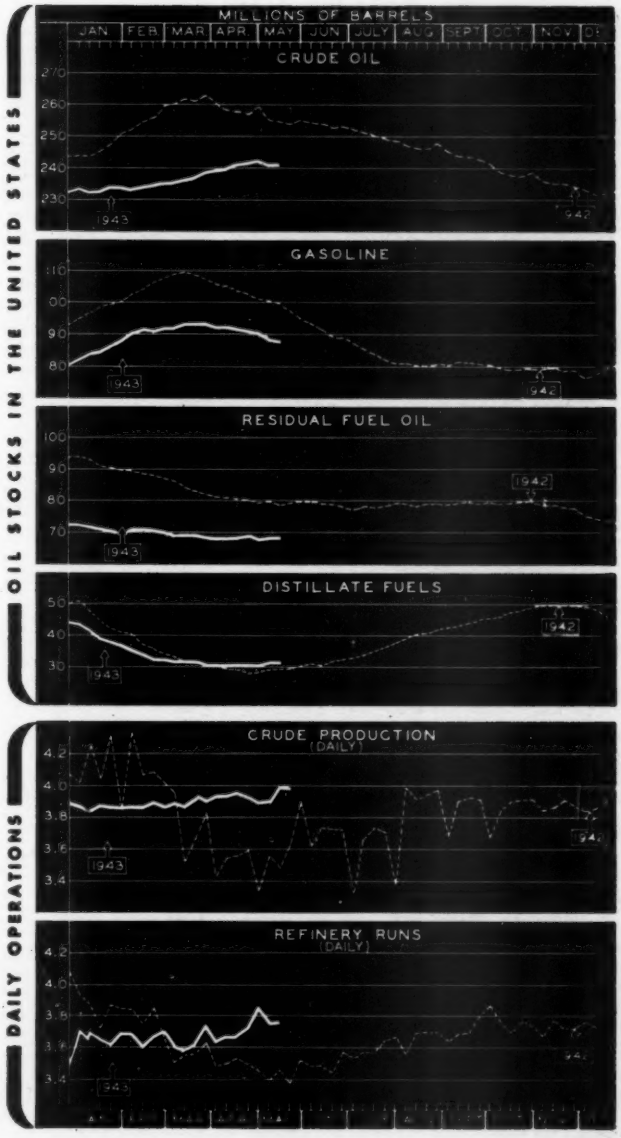
REFINERY RUNS 3,768,000 bbl. daily week ended May 15—up 13,000. One year ago 3,400,000 bbl.

*Last week 241,856,000.

PERMISSION to drill shallow wells on closer patterns in a big chunk of the southern Mid-Continent means at least two things. First, it is confirmation of the acute shortage of crude in District 2 developing even more rapidly than some conservative operators anticipated. Second, it means that one more barrier to producing operations imposed at the outset of the war has been set aside. Furthermore, the relaxed spacing program eliminates one more alternative to a price advance which operators still strongly contend is the necessary companion means of lifting production.

THE lifting of 40-acre spacing restrictions on wells down to 3,000 ft., adjusted on a sliding scale according to depth, does not mean that more materials are available to the industry. On the contrary, Mid-Continent producers heard last week that critical shortages of supplies appear to be with the industry as long as the war continues. Evidence, however, is contained in the most recent spacing exemption and those which preceded it in eastern fields, California and parts of Illinois, Indiana and Kentucky that expediency is becoming a more important factor. In the early history of M-68 and subsequent orders virtually halting development wells in many fields, every obstruction, so it seemed to operators, was thrown up against drilling of existing reserves.

TEMPORARILY frustrated by OPA in a lifting of price ceilings to encourage exploratory drilling, PAW has turned to the next best incentive under the existing circumstances. Confronted with the problem of insuring adequate petroleum supplies for prosecution of the war and for essential civilian requirements, PAW naturally is turning to whatever tools are at hand. The petroleum agency still would prefer to concentrate drilling operations on wildcat prospects, confident that the industry, if granted necessary incentive in the form of gain on investments, would discover enough new oil to meet current exigencies. With a few exceptions, the tonnage of steel expended per barrel of production is less in flush fields than in settled areas, although both types of production will be none too much for the war and reconstruction periods. Thirty to sixty days will be required to indicate whether modification of the spacing program will stem the decline in District 2 crude supplies. But if the results are inadequate, surely the PAW will have at least built a stronger case for its recommended advance in price ceilings.



Critical Oil Shortage on East Coast Brings Redoubled Curb on Users

by Henry D. Ralph

WASHINGTON, D. C.—Despite hasty emergency action of bypassing the break in the big-inch pipe line which went back into service this week, the 7-day interruption of runs accentuated an already acute shortage of petroleum products in the East and brought about a renewal of the prohibition on pleasure driving in 12 states.

Stocks of gasoline along the East Coast have been diminishing steadily for several weeks, due, apparently, to increased military liftings because rail deliveries have been at new high levels and the heating season has ended throughout the area. Many filling stations have been entirely without supplies for varying periods recently, and farmers report being unable to obtain sufficient tractor fuel to continue their plantings.

The Petroleum Administration for War notified the Office of Price Administration last week that the supply of gasoline for civilian rationing in June would be 356,000 bbl. a day for the 17 East Coast states in District 1, the same as the May figure, compared with 333,000 bbl. per day in April and 315,000 bbl. a day in March. In spite of this increase above winter levels the consumption has been above current deliveries, indicating that the OPA has issued too many ration coupons or that there are extensive "black market" operations. Furthermore, crop planting and other agricultural activity contributed to a rise in consumption.

Cut Considered Earlier

Action to curtail less essential consumption by tighter supervision and by reexamination of commercial and extra passenger-car allotments was under consideration by OPA when word reached Washington that the big-inch pipe line had broken in the flood temporarily reducing tank-car shipments of petroleum to the East. Tank-car deliveries to District 1 hit a new high of 980,652 bbl. daily the week before the big-inch broke.

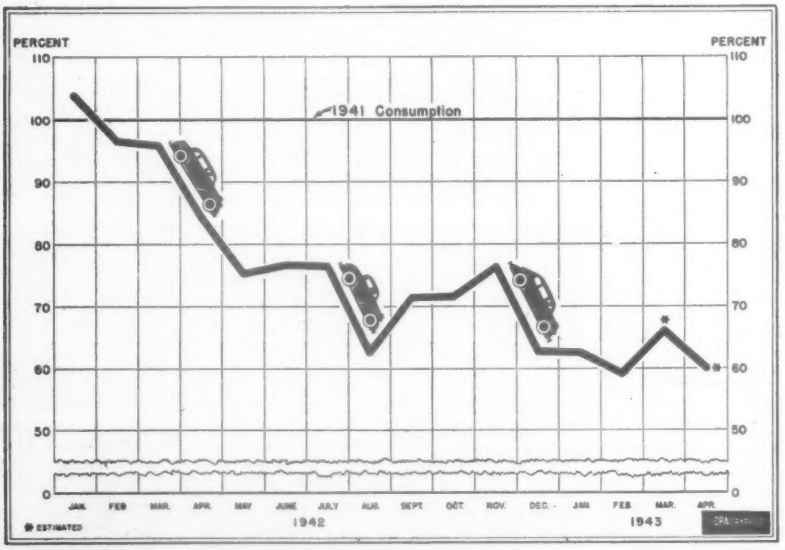
Throughout the shortage area OPA applied drastic rules defining pleasure driving and banning many types of border-line cases. ODT cut commercial gasoline use 40 per cent by requiring outstanding T coupons to last until July 25 instead of issuing new ones on June 30, and also curtailed deliveries of many types of commodities considered not essential.

Washington, D. C., was hit harder by the shortage than most localities in the East, with virtually all filling stations dry at the beginning of the week and only half a day's supply known to be en route. Bus lines were drastically shortened and half the capital's taxicabs were off the streets and the rest limited to 5 gal. or less per day. PAW officials said the local situation might not improve for 2 or 3 weeks and that other points in the shortage area might be affected as severely before the supply improves generally.

ODT said that Middle West floods are so disrupting rail traffic that tank-car shipments of oil to the East will be only half of normal for several days and will be 20 per cent below normal for some time, with the chief effects of the floods yet to be felt. Barge movements also are hampered by high water and flooded terminals. Much depends on whether lower Mississippi River rail crossings are flooded before northern gateways are reopened. Some of the 9,000 tank cars which have been operating out of Norris City have been diverted to the Southwest to carry oil clear through to the East but necessity for circuitous routes greatly reduces efficiency. Virtually none of the symbol routes for moving tank-car trains on fast schedules remains intact.

The ban on nonessential motoring was applied by OPA at noon on May 20 in all of New England, New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Virginia, and eight counties in West Virginia. The southern states of District 1 were not included because the gasoline shortage is not so acute in that section. The definition of nonessential driving was the same as that in effect last January and February throughout District 1, and is being enforced by OPA inspectors and local police officers.

While refusing to comment on the OPA rationing system or to suggest any ways of bringing gasoline consumption into balance with supplies, Petroleum Administrator Ickes told a



Three days before a critical relapse of the supply situation forced renewal of the ban on eastern pleasure driving and drastic curbs on commercial vehicles, OPA released this chart showing how rationing had reduced consumption about 40 per cent

press conference May 20 that the East would be on short rations for several weeks at least. He said that if there had been no nonessential driving this spring storage supplies of gasoline would have been built up so that a temporary break in the big-inch would not have caused special hardship.

The possibility that gasoline consumption might have to be further curtailed in the Middle West was forecast by Mr. Ickes, who pointed out that stocks there might have to be diverted to the East until transportation from the Southwest can be restored to its normal level.

While appealing to the East's 8,000,000 motorists to cooperate by voluntarily cutting out all trips that are not absolutely necessary, Prentiss Brown, OPA administrator, emphasized that in view of the present crisis OPA enforcement officials will proceed with all vigor to detect violators and to suspend rations.

At the same time Price Administrator Brown appealed for the cooperation of state and local police in telegrams to the 12 governors. In these messages OPA requested local and state police to:

1. Stop and question all motorists driving under circumstances which indicate a violation of the ban.

2. Question all motorists stopped for traffic violations to ascertain if they are violating the ban.

3. Check on motorists found at race tracks, amusement parks, beaches and other places where their presence is prima facie evidence of a violation.

In addition all available OPA investigators will be assigned to the job of detecting violators, either independently or in cooperation with the police.

Consumption Excessive

"The fact is," declared Administrator Ickes, "that considerably more than 356,000 bbl. of gasoline daily have been consumed in the Atlantic seaboard area during May. The inevitable consequence of this has been that, in order to meet emergencies, including the requirements of farmers and of the war workers, we have had to make further drains upon our already critically depleted stocks.

"Now, we just cannot continue to operate on any such basis. If we attempted to do so, we would drain our storage completely dry, and the chaos that would result is beyond imagination.

"Inventories of petroleum products in the East, available for civilian consumption, are the lowest that they have ever been. They have been declining steadily. At the beginning of April, the American Petroleum Institute's index of these available stocks stood at 30.5 per cent of normal. This index has declined week by week to 28.8 per cent to 28.1, to 26.3, and finally, last week, to only 25.5 per per cent of normal.

"Surely these figures speak for themselves. This decline has taken place in spite of the fact that the overland movement of petroleum and petroleum products has increased with virtually every passing week.

"The reason for this seemingly anomalous situation should become obvious with a little thought. The military demand for petroleum products this spring has been perfectly enormous. It required oceans of oil to prosecute the spectacular Tunisian offensive. It is requiring still more oceans of oil to get ready for the vastly greater offensives to come.

"Of course, it is true that the Army and Navy are not requiring ordinary motor gasoline in relatively large quantities. But, the petroleum products which the Army and Navy must have—the 100-octane aviation gasoline, the 80-octane all-purpose gasoline, the aviation lubricants, and the other petroleum necessities of war—have had to be moved to transshipment ports in the only flexible transportation that we have, railway tank cars.

"I wish—in the interest of public understanding—that I might reveal the amount of petroleum products that are moving overland every day—for the use of the Army and Navy, and for our Allies. I wish that I might reveal the amount of crude oil that we are moving every day in order that eastern refineries may turn out war products in the enormous amounts that are required."

Press Association Photo

Petroleum makes up a large part of supplies for American troops in various theaters of war, taking it away from nonessential service. Confirmation is given by the oil drums in this supply dump on Amchitka which since has been more than duplicated on Attu island

Cities Service Given Pipe for Hugoton Line

WASHINGTON, D. C.—The War Production Board May 24 issued preference rating certificates to Cities Service Transportation & Chemical Co. for immediate construction of a 26-in. natural-gas pipe line from the Hugoton field in the center of Texas County, Oklahoma, 240 miles eastward to Blackwell, Okla., to connect with Cities Service system.

The line will require 55,000 tons of steel and will be completed by December to carry 140,000,000 cu. ft. daily and will serve principally the area between Wichita, Kans., and Kansas City and Springfield, Mo. The gas will replace that from the West Cement, Oklahoma, field closed to further withdrawals May 18 by the Oklahoma Corporation Commission at request of Petroleum Administration for War from which Cities Service drew 80,000,000 cu. ft. daily.

WPB specified that neighboring systems be assured the opportunity to obtain deliveries from the line to assist in meeting any possible deficiencies during the war and for 1 year thereafter. The company must obtain any necessary approval from the Federal Power Commission and other interested regulatory bodies and must obtain PAW approval for wells and gathering lines in the Hugoton field.

Canadian Government Organizes Company to Assist Oil Operators

CHATHAM, Ont. — Wartime Oils, the newly created government-sponsored company to assist in expanding western Canadian oil production, has completed its formal organization, opened offices at Calgary and is preparing to assist Turner Valley marginal drilling. Officers of the company are: A. A. Carpenter, president; J. Grant Spratt, vice president; K. J. Morrison, secretary-treasurer; Col. L. D. W. Baxter and A. H. Mayland, directors. Maj. C. J. Stewart of Calgary, formerly connected with drilling operations, has been appointed field manager.

The board has approved several applications for financial assistance to companies undertaking the development of Turner Valley oil properties, subject to the completion of formal agreements. Several operations sponsored by the government company will be under way within a few weeks.

The company will advance money to finance drilling, the loans to be repaid with 3½ per cent interest out of production. There will also be a royalty of 1 per cent on the first $25,000 advanced, or any part thereof, plus a further one-fourth of 1 per cent on each additional $12,500 or any part thereof. After repayment of money advanced, the producing wells will be taken over by the private operators, without any further obligations to the crown company.

No details have been made public as to the handling and control of drilling, but it is presumed a system of joint management of these operations will be worked out. The company will use every effort to expedite drilling operations, and hopes to have most if not all the now untested well sites in the proven and semi-proven Turner Valley area drilled out this year.

G. R. Cottrelle, federal oil controller, visited Calgary last week to confer with the company heads and assist in launching the project.

NEW OFFICERS OF TULSA ENGINEERS CLUB . . .

These new officers of the Tulsa Engineers Club will be installed at the annual meeting June 7. Front row: A. H. Hardy, War Production Board, vice president in charge of public relations; Ray E. Carter, Unit Rig & Equipment Co., executive vice president; F. M. Carroll, Shell Oil Co., Inc., president, and H. T. Frost, secretary. Back row: Clarence G. Glasgow, vice president in charge of membership; C. V. Millikan, Amerada Petroleum Corp., formerly executive vice president, now a director; D. O. Johnson, S. M. Jones Co., vice president in charge of entertainment; Frank B. Taylor, the Oil Weekly, former president, now a director, and W. L. Ducker, Product Engineering Co., a director. D. E. Fields, Tulsa Boiler & Machinery Co., new treasurer, and T. D. Williamson, Jr., Petroleum Engineering & Equipment Co., vice president in charge of programs, were missing when the picture was made. Joseph A. Brandt, president, University of Oklahoma, will speak at the annual meeting at the Tulsa Building

June Production Quota Cut 18,500-Bbl. Daily

WASHINGTON, D. C. — A net decrease of 18,500 bbl. in the daily petroleum production rate for June certified by the Petroleum Administration for War is shown by the quotas released here last week. PAW calculated June requirements at 4,218,900 bbl. daily, including natural gasoline and condensate.

The only state assigned a substantial increase in June was Texas where daily output of 1,602,000 bbl. of all petroleum liquids was certified by PAW, a gain of 40,000 bbl. over the May quota. Minor increases of 700 bbl. per day in Ohio and 600 bbl. daily in California were more than offset by substantial downward revisions in the rates of production certified in Districts 1, 2 and 4.

The reduction of 28,500 bbl. in the daily quota assigned Louisiana was the most substantial decline provided in the PAW certification. Authorized production in Kansas was reduced to 300,000 bbl. daily, a cut of 9,700 bbl. from the May quota, reflecting an expressed desire of producers in certain fields to reduce their rate of withdrawals in order to retard water encroachment and pressure declines.

Reductions in the quotas assigned Illinois, Michigan and Oklahoma are largely reflections of curtailed ability to produce. The same situation prevails in Pennsylvania and West Virginia where combined quotas were reduced 4,500 bbl.

Barrels Daily, All Petroleum Liquids

	June	May
District 1:		
New York	15,000	15,000
Pennsylvania	48,000	50,000
West Virginia	15,000	17,500
District total	78,000	82,500
District 2:		
Illinois	246,200	250,800
Indiana	15,500	16,000
Kansas	300,000	309,700
Kentucky	23,100	23,500
Michigan	58,900	62,100
Nebraska	2,400	2,400
Ohio	10,400	9,700
Oklahoma	373,500	379,000
District total	1,030,000	1,053,200
District 3:		
Arkansas	72,800	73,000
Louisiana	330,800	359,300
Mississippi	50,000	50,000
New Mexico	105,700	105,700
Texas	1,602,000	1,562,000
District total	2,161,300	2,150,000
District 4:		
Colorado	7,000	7,400
Montana	22,300	24,600
Wyoming	97,000	97,000
District total	126,300	129,000
District 5:		
California	823,300	822,700
Total United States	4,218,900	4,237,400

THIS WEEK

PRODUCTION—Spacing regulations finally relaxed, in eastern Kansas, most of Oklahoma, North and North Central Texas. . . . Liberalization permits 5, 10 and 20-acre spacing, depending on depths, down to 3,000 ft. . . . Areas offer maximum opportunity for increasing shallow production, with minimum use of critical materials. . . . Most significant conclusion from PAW action is that crude shortage is actually at hand, that stop-gap methods are spreading. . . . ¶Another Ellenburger showing in West Texas enhances outlook for spread of deep production. . . . Another blanket exception, permitting more freedom in development, applies to the Dorcheat-Macedonia field, Arkansas. . . .

TRANSPORTATION—WEP executives, pipe-line contractors, exceed all estimates of time required to get 24-in. back in service. . . . Less than 1 week required to bypass Arkansas River crossing break, with 20-in. borrowed from products line. . . . ¶Rail shipments expected to suffer from flood. . . . ¶Tank-car movement hit peak of 980,326 bbl. daily, week ended May 15. . . . ¶All freight, except oil and perishable goods, embargoed in Southwest, until floods recede, damage repaired. . . .

REFINING—Another butadiene plant, 15,000 tons capacity, goes on stream, at Baton Rouge. . . . ¶Twenty-seven synthetic-rubber units, out of 84 projected at this time, in operation or ready to start. . . . Account for about 30 per cent of projected capacity, or 252,000 tons annually. . . .

MATERIALS—WPB earmarks 55,000 tons of steel for Cities Service Transportation & Chemical Co. 26-in. gas line, Texas County, Oklahoma, to Blackwell. . . . ¶Producers must become familiar with Form PD-873, it's the key they must rely upon under P-98-b. . . . For all practical purposes, P-98-b is only material order available to industry, including all branches. . . . More details released on PAW arrangement for emergency field stocks. . . . Fourteen depots to serve industry. . . . Stocks of supplies to be on revolving basis. . . .

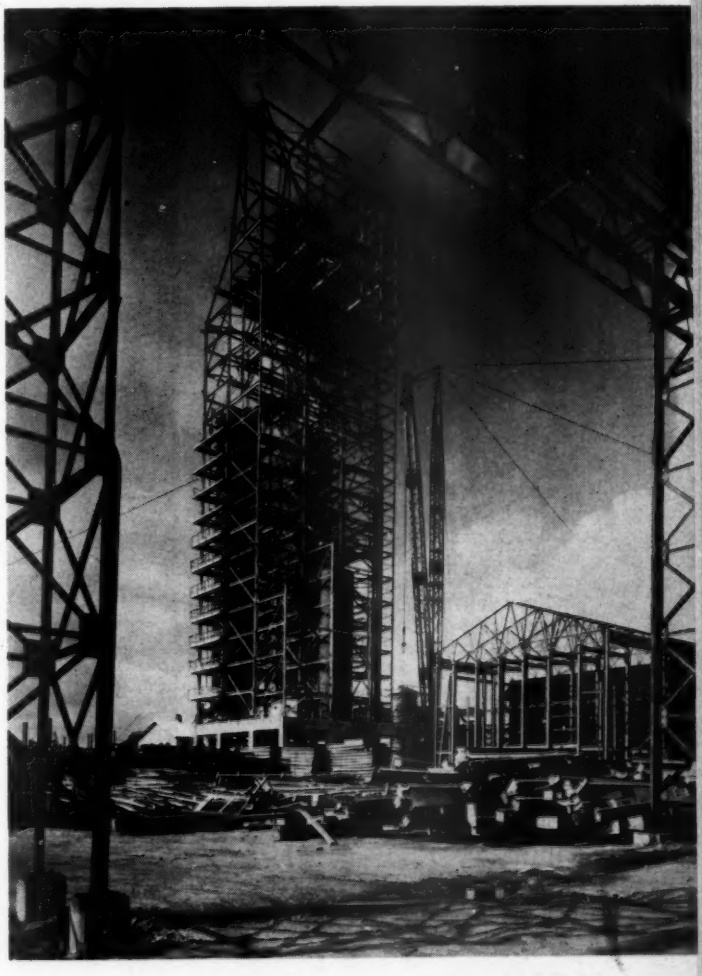
SUPPLIES—Increasing military demands prevent any substantial headway on overcoming eastern shortage. . . . ¶Index remains at 27.1 per cent of normal. . . . ¶Failure of services to give industry advance notice of requirements drawing intensified protests. . . . Lend-lease expects to send $752,000,000 worth of petroleum products abroad in 14 months, ended June 30, 1944. . . . Bulk to originate in this country, some from South America. . . .

RATIONING—PAW Ickes hints at spreading pleasure driving ban, or reduced coupon values, to Middle West, to divert motor fuel eastward. . . . ¶OPA announces simple, but important, change in thermal zones, for next winter's fuel rationing. . . . ¶Commercial vehicles, throughout East, curbed in gasoline consumption. . . . Deliveries of nonessential commodities halted entirely; life of T coupons extended, thus lowering deliverable gallonage. . . . ¶PAW, OPA, other agencies move to assure farmers of adequate fuel, probably meaning indefinite ban on eastern pleasure driving. . . .

MANPOWER—Machinery set up for appeals by employes and employers from any WMC action under employment stabilization plan. . . . Says who can appeal, how plea should be prepared, where it should be filed. . . .

INTERNATIONAL—Indicated discovery by Shell subsidiary in Colombia nearest producing prospect to tidewater. . . . ¶Positive confirmation lacking on equipment agreement with Mexico. . . . But the 5,000-bbl. aviation-gasoline plant seems most advanced of various projects. . . .

Two 10,000-bbl.-daily catalytic-cracking units (T.C.C. type) under construction at a refinery of the Magnolia Petroleum Co. These plants, to be completed in July, will manufacture hydrocarbons used in making synthetic rubber and 100-octane gasoline



Shell Opens Potential Oil Field in Colombia

by J. P. O'Donnell

NEW YORK.—The possibility that a new oil field has been discovered in Colombia was indicated by production tests on 1 El Dificil, drilled in the hitherto unproductive Departmento Magdalena by a Shell producing subsidiary, Cia. de Petroleos la Estrella de Colombia. According to reports, the well flowed 130 bbl. per day of 46° A.P.I. gravity crude oil with 1,300,000 cu. ft. of gas through a $\frac{7}{16}$-in. choke. Tubing pressure was reported to be 2,375 lb. The well encountered a pronounced gas cap above the 600 ft. of porous limestone from which it is producing. Total depth is 5,930 ft. Creditable sources state that the well is on a major structure and they regard it as an excellent prospect.

In addition to being the second Shell discovery in Colombia in a little more than 1½ years, the El Dificil well is notable in several other respects. The gravity of the oil ranks with the highest yet found in the country, comparing with 25.4° for La Cira and Infantas and 43° for Petrolea, the older fields, and 21.5° for Casabe and 35° for Socuavo, most recent discoveries. Most significant, however, is the location of the well. It is much closer to tidewater than any of the previous discoveries and the area, therefore, may be developed faster than earlier discoveries if and when other conditions are favorable.

Nearest to Tidewater

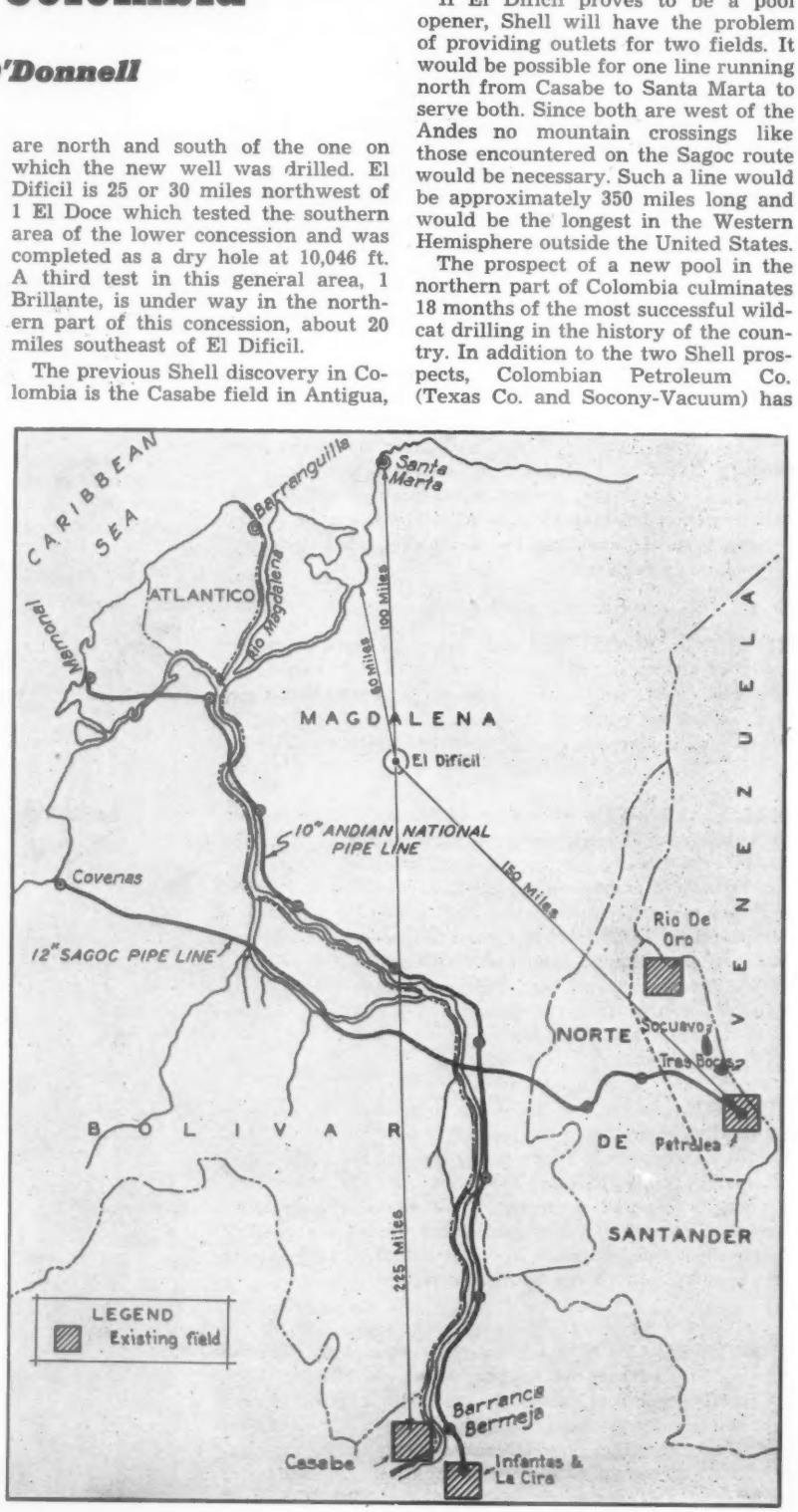
El Dificil is approximately 60 miles from tidewater and about 100 miles directly south of the Caribbean port of Santa Marta. Departmento Magdalena is generally flat so that building a pipe line to a deep water terminal would be considerably easier and much less expensive than either of the lines from the Barco concession, approximately 150 miles southeast of El Dificil, or the DeMares concession, 250 miles to the south. The Sagoc (South American Gulf Oil Co.) line from the Barco to Covenas is 261 miles long and crosses the mile-high Reiber pass in the Andes. The Andian National pipe line from the DeMares concession of Tropical Oil Co. is 335 miles in length.

El Dificil is near the center of a 48,569-hectare (120,000 acres) concession, one of several which Shell holds in Departmento Magdalena. The others are north and south of the one on which the new well was drilled. El Dificil is 25 or 30 miles northwest of 1 El Doce which tested the southern area of the lower concession and was completed as a dry hole at 10,046 ft. A third test in this general area, 1 Brillante, is under way in the northern part of this concession, about 20 miles southeast of El Dificil.

The previous Shell discovery in Colombia is the Casabe field in Antigua, across the Magdalena River and a short distance northwest of Tropical's DeMares concession. Casabe 1 was completed on the 115,600-acre Yondo concession in October 1941. Nine wells have been completed so far in this field. It is lacking an outlet, however, and therefore has not been produced.

If El Dificil proves to be a pool opener, Shell will have the problem of providing outlets for two fields. It would be possible for one line running north from Casabe to Santa Marta to serve both. Since both are west of the Andes no mountain crossings like those encountered on the Sagoc route would be necessary. Such a line would be approximately 350 miles long and would be the longest in the Western Hemisphere outside the United States.

The prospect of a new pool in the northern part of Colombia culminates 18 months of the most successful wildcat drilling in the history of the country. In addition to the two Shell prospects, Colombian Petroleum Co. (Texas Co. and Socony-Vacuum) has



found two new producing areas on the Barco concession which are regarded as promising. Like El Dificil, however, further drilling will be required before all prospects are confirmed.

These developments have come at a time when Colombia's oil position is at the lowest point in its history. Lack of shipping has virtually eliminated exports and prevented imports of equipment. Inability to obtain equipment will delay indefinitely the proving of the new prospects. The effect of the loss of exports on Colombian production is shown in the accompanying table comparing production for the first quarter of this year with the corresponding period of 1942.

Production in the first quarter of 1943 totaled 1,034,500 bbl. and compared with 5,845,000 bbl. for the same period of 1942. While this was a severe decline, the first quarter production for this year was up markedly from the last quarter of 1942 when it totaled only 570,000 bbl. The daily average production for the first 3 months of this year compared with the same months of 1942 follows:

Month—	1942	1943
January	71,387	6,727
February	83,428	11,936
March	41,806	15,215
First quarter	64,944	11,494

Glenn Campbell Made Chief of PAW Priority Unit

WASHINGTON, D. C. — Glenn A. Campbell, of Tulsa, vice president for rotary tools of the American Association of Oilwell Drilling Contractors, has been appointed chief of the priorities unit of the Production Division, Petroleum Administration for War. He will represent the viewpoint of independent drilling contractors but will pass on all types of production priority matters.

Fourteen Depots to Hold Emergency Equipment

WASHINGTON, D. C.—Emergency depots for oil-country tubular goods will be established in 14 centers during the third quarter of this year to meet the needs of operators under a plan just approved by the Petroleum Administration for War.

The plan has been approved by the War Production Board, but location of the depots has not yet been definitely determined. Highlights of the plan are:

1. An aggregate of 20,000 tons of rolled oil-country tubular goods will be kept on hand at steel mills for emergency use by operators who drill less than 40,000 ft. annually. This material will be set aside for these smaller operators because they cannot project their future needs far in advance. Larger operators are able to plan their materials requirements because of the large volume of exploratory work conducted by them each year, and these operators are required to apply in advance for the materials they will need for each succeeding quarter of the year.

2. An aggregate of 10,000 tons of tubular goods will be kept in stock in 14 depots for emergency use by all wildcat operators.

3. Orders will not be filled from these emergency stockpiles unless the operator's request is approved by the PAW district director of production in the district in which the material will be used.

4. All materials in these stocks must be acquired under the terms of Preference Rating Order P-98-b.

Oil Men Invited to Hear Order P-98-b Explained

Mid-Continent oil operators have been invited to a meeting in Tulsa at 10 a.m., May 29, at which officials of the Petroleum Administration for War will explain the new materials priority setup under P-98-b, amended. H. R. Hensen, Materials Division, PAW, Washington, D. C., and Loyal B. Holland, director of materials for District 2, will handle the discussion and answer questions. The Tulsa meeting will be held in the Tulsa building.

Bennett Honorary Doctor of Engineering

COLLEGE STATION, Tex. — E. O. Bennett, chief petroleum engineer for Continental Oil Co., Ponca City, Okla., was awarded the honorary degree of doctor of engineering here last week by the Agricultural and Mechanical College of Texas in recognition of his outstanding contribution to engineering science. Dean F. C. Boton, of the school of engineering, and F. M. Law, president of the board of directors, conducted the presentation ceremony. Conferment of the degree was made by President P. O. Walton.

E. O. BENNETT

Dr. Bennett was the recipient of the Hanlon Award in 1942 for distinguished service to the natural-gasoline industry, the highest annual award given in this branch of the petroleum industry.

Dr. Bennett was born in San Pedro, Calif. He completed grade and high schools in Los Angeles, then graduated at Stanford University, receiving degrees of bachelor of arts and mechanical engineer, and was elected to Sigma Xi, national scientific society.

After college Mr. Bennett went to work for the Standard Oil Co. of California in the production and pipeline department. His service during the previous World War was that of engineer in charge of the research laboratory of the National Advisory Committee for Aeronautics at Langley Field, Virginia.

After the war, he returned to the Standard of California, remaining there until 1924, when he was appointed natural-gas engineer and petroleum technologist with the U. S. Bureau of Mines.

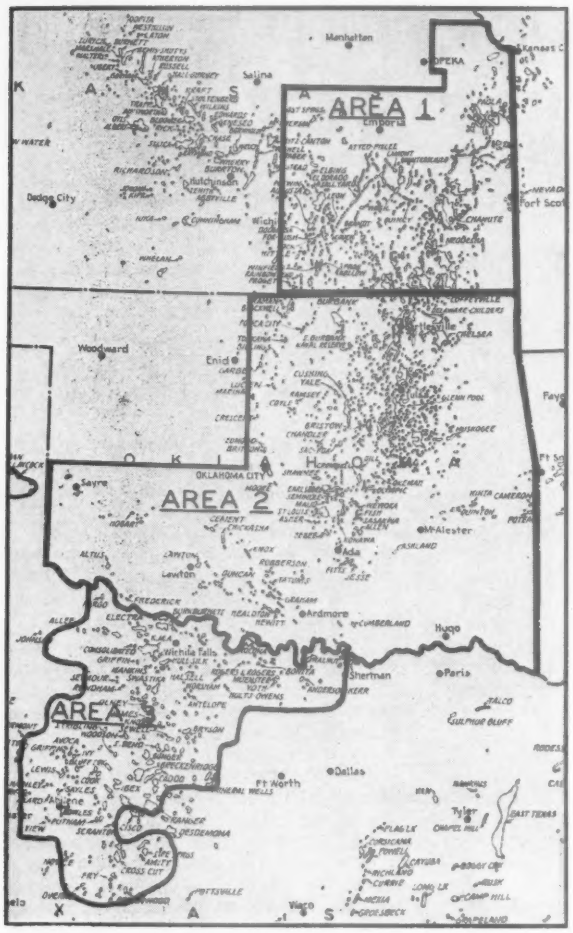
Dr. Bennett has been with Continental Oil Co. since 1926, having served as chief engineer, assistant manager of drilling and production, and is currently chief petroleum engineer. During the 26 years of service in the oil industry he has been granted many patents for pipe line, drilling, and production equipment.

Standard of Louisiana Completes Butadiene Plant

BATON ROUGE, La.—Completion of Standard Oil Co. of Louisiana's butadiene plant here has been announced by M. J. Rathbone, president of the company. The new plant's rated capacity is 15,000 tons a year.

Ralph W. Gallagher, president of Standard Oil Co. (New Jersey) notified William M. Jeffers, national rubber director, that putting the new plant in production meant completion of all plant construction "relating to the Government buna program" in Baton Rouge, and "was the first completion within the oil industry of an entire assignment of this nature under the government war rubber program."

Shallow Mid-Continent Fields Granted Closer Well-Spacing Patterns



Heavy lines show the Mid-Continent areas in which spacing of 5, 10 and 20 acres, depending on depths of wells down to 3,000 ft. is permitted by Supplementary Order 8 to PAO 11

WASHINGTON, D. C.—A new supplementary order drastically modifying the shallow-well spacing limitations in eastern Kansas, most of Oklahoma and in North and North Central Texas was issued here last week by the Petroleum Administration for War. Relaxation of spacing provisions in the three districts is designed to stimulate development of new reserves and exploration for new fields.

Oil men and government officials generally agreed this week that the three areas covered by the blanket exemption to 40-acre spacing for wells down to 3,000 ft., offer one of the best opportunities in the entire country for greater production from closer spacing.

One of the most acute shortages of crude in the nation is developing rapidly in the territory covered by the new order which is officially designated as Supplementary Order 8 to PAO 11. Currently, the three exempted areas are producing about 762,100 bbl. of crude daily against 790,850 at the start of the year. There is general agreement that the current rate of withdrawals is excessive in certain portions of the three areas, although production data includes western Kansas which is not designated for closer spacing. This, however, merely emphasizes the necessity for stimulating production in the older areas which produce chiefly from shallow pays.

Heavy concentration of idle pipeline capacity in the Mid-Continent adds to the desire to stimulate production in that district, if the objectives can be accomplished by reasonable expenditure of critical materials. Because of the shallow zones specified in the permission for closer spacing, PAW officials and operators contend that much of the additional drilling can be prosecuted without causing a serious drain on materials.

Normal depletion in the Mid-Continent, which is lacking prolific new fields and substantial reserves immediately producible, makes the procurement of necessary crude by Middle West refineries a problem of increasing magnitude. Considerable crude is imported into the district, a trend that is expanding from month to month. Less than 3 weeks ago, PAW established specific crude quotas for every Middle West refinery in order to derive the maximum production of war materials from manufacturing facilities and to spread the available supplies of crude oil on an equitable basis among refineries.

Equipment Regulations

Under the new order, materials may be used to drill and equip oil wells in these areas under the following conditions:

1. Five-acre spacing for oil wells completed at depths not exceeding 1,200 ft.
2. Ten-acre spacing for oil wells completed at depths between 1,200 and 2,000 ft.
3. Twenty-acre spacing for oil wells completed at depths between 2,000 and 3,000 ft.
4. Forty-acre spacing for oil wells completed at depths greater than 3,000 ft.
5. Pumping or artificial-lift equipment may be installed on oil wells completed at depths not exceeding 1,200 ft., provided that such installations do not exceed an average of one well to 5 productive acres.

The new supplementary order applies only to oil wells and the existing restrictions on the use of material for drilling and completing gas wells remain unchanged. If, in the course of drilling operations under the new order, a gas well is obtained, application for an exception must be filed with the PAW district office before completion as a gas well.

The new well-spacing provisions are, PAW said, a continuation of its announced policy of issuing supplements to PAO 11 designed especially to fit operating conditions peculiar to the various oil fields of the United States, whereas the facts justify less

restrictive measures than the general provisions of PAO 11.

Previously, parts of Illinois, Indiana and Kentucky were granted a blanket exception to spacing provisions of PAO 11 and, more recently, certain California fields were exempted from the 40-acre spacing rule under specified conditions. Several eastern fields have been exempted from 40-acre spacing since PAO 11 was issued.

Text of Supplementary Order 8 to PAO 11

GENERAL exception pursuant to paragraph (c) (10) of Petroleum Administrative Order 11.

(a) **Scope of this order.**—Except as otherwise modified by the provisions of any other order issued as a supplement to Petroleum Administrative Order 11 or by the provisions of any exception issued pursuant to paragraph (c) (10) of Petroleum Administrative Order 11, the provisions of this order shall to the extent provides herein be applicable to certain crude-oil operations in eastern Kansas, eastern and southern Oklahoma, North and West Central Texas, but not elsewhere.

(b) **Definitions.**—The definitions of Petroleum Administrative Order 11 shall apply in this order. In addition:

1. "Area 1" means the area specified in paragraph (a) of Exhibit A hereof.

2. "Area 2" means the area specified in paragraph (b) of Exhibit A hereof.

3. "Area 3" means the area specified in paragraph (c) of Exhibit A hereof.

(c) **Oil wells drilled in Areas 1, 2 and 3.**—Pursuant to paragraph (c) (10) of Petroleum Administrative Order 11 any person may accept delivery of, acquire, or use material to drill, complete, equip, connect, or provide additions to any oil well in Areas 1, 2, or 3; provided, that:

Rules on Drilling

1. Such well is drilled in conformity with the well-spacing provisions contained in paragraph (d) of this order; and

2. All separate property interests in the drilling unit on which such well is drilled are first consolidated with each other; and

3. The drilling unit upon which such well is drilled consists entirely of acreage upon which no other drilling or producible well is located; and

4. The direct linear distance between any two points which are farthest removed from each other on the drilling unit upon which such well is drilled does not exceed the length of the diagonal of a rectangular, the length of which is twice its width and

(Continued on Page 39)

Federal Order Digest

PAW Regulations

Well Spacing—SO 7, PAO 11: Grants priorities for wells on 20-acre spacing in 12 Michigan counties, providing they are completed at depths of 2,000 ft. or less, effective May 18.

Well Spacing—SO 8, PAO 11: Establishes priorities for wells in eastern Kansas, most of Oklahoma, North and North Central Texas on a sliding spacing scale of 5 acres for completions 1,200 ft. or less; 10 acres from 1,200 to 2,000 ft. and 20 acres down to 3,000 ft., effective May 21.

WPB Limitation Orders

Wax—GPO M-195: Places microcrystalline wax and its blends under allocation control, prohibiting suppliers from using or making delivery of wax and consumers from accepting delivery without specific WPB approval, effective July 1.

Isopropyl Alcohol — GPO M-168, amended: Simplifies allocation procedure and reduces paper work by abolishing requirement that Forms PD-600 and PD-601 be filed, effective June 1.

Scrap Rubber—SO M-15-b, amended: Excludes reusable tire carcasses from rubber scrap now being processed by reclaiming plants, to obtain additional mileage from serviceable tires, effective May 20.

Fibre Drums—CO M-313: Establishes procedure for allocating shipments of cylindrical fiber shipping drums by manufacturers, effective June 16.

Oxyacetylene Apparatus—GCO L-268, amended: Modifies control of manufacture and distribution and redefines apparatus to cover power-driven and acetylene generators as well as manually operated machines, effective May 19.

Copper — CO M-9-c, amended: Tightens various provisions on use and relaxes others that are found unworkable; stricter regulations apply to use of copper in oil wells, effective May 17.

Decentralization — Special order raises dollar limit of PD-1a applications processed in the field from $100 to $500, effective May 8.

Interpretation—GSO M-293: Rules that orders placed for Class Y components may be placed with a distributor without obtaining WPB authorization, issued May 15.

Telephones — U-2: Restricts telephone installations, issued May 15.

Controlled Materials Orders

Uprating Orders—CMPR 3, amended: Terminates use of allotment numbers as an uprating device for obtaining noncontrolled materials, effective June 30.

Classification—CMP 3, Direction 1, revised: Expresses intention of placing rated orders of dealers, distributors and jobbers on a par with orders in the same rating band bearing allotment numbers or symbols, issued May 15.

OPA Rationing Orders

Rubber—RO 1-a, Amendment 28: Removes all rationing restrictions on the sale of used passenger car and truck inner tubes, effective May 20.

Rubber—RO 1-a, Amendment 29: Provides means of getting diminishing supplies of tires in trade channels down to the dealer level, effective May 20.

Fuel Oil—Provides for an important, but simple change in thermal zones in next year's fuel-oil ration plan to permit closer adjustment of supply to weather conditions, announced May 17.

Gasoline—RO 5-c, Amendment 50: Brings large bulk users of gasoline, railroad and bus companies, owners of large farms and others, into ration banking system, effective June 15.

Gasoline—RO 5-c, Amendment 51: Renews enforced prohibition on pleasure driving in 12 eastern states, effective May 20.

OPA Price Regulations

Navy Fuel Oil—RVS 88, Amendment 102: Provides specific dollars-and-cents ceilings for Navy special fuel oil, with three exceptions, effective May 18.

Fuel Oil—RPS 88, Amendment 100: Permits maximum charge of 5.1 cents per gallon f.o.b. sellers' terminals on fuel with maximum viscosity of 300 Saybolt Universal at 100° F., effective May 25.

Petroleum Products — RPS 88, Amendment 101: Spells out in cents-per-gallon figures additions that have been previously authorized to the maximum prices of petroleum products on account of transportation and other cost changes, effective May 28.

Fuel—MPR 323, Amendment 5: Places maximum prices of imported asphalt and asphalt products under GMPR and SR 12, effective May 25.

Manpower Orders

Regulation 5: Provides machinery for appeals by employes and employers from any War Manpower Commission action under employment stabilization plans, the 48-hour week policy and other regulations, effective May 22.

Professional and Technical: Announcement assures all-round placement services for professional and technical men and women in critical fields when registered with local U. S. Employment Service offices, issued May 23.

State Capitals

ILLINOIS

THE STATE ADMINISTRATION'S petroleum conservation bill, a measure which is reported to be representative of the policies of conservative operators, last week was introduced in the legislature at Springfield.

The new bill calls for a three-member commission, with authority over the industry of considerably broader nature than exists at present on the part of the state Mines and Minerals Department. Not more than two members would represent one political party.

Principal provisions of the new bill would:

Limit oil production to market demand; allocate pool or field production, regulate well spacing and repressuring and pressure maintenance and shooting, perforating of wells and secondary recovery; give authority to fix an efficient gas-oil ratio; establish drainage units and mineable areas; designate buyers of oil as common purchasers; provide for pooling of tracts smaller than drainage units; provide for compulsory repressuring of a pool or a part of a pool; give the commission power to seize and dispose of oil produced in violation of the act or the commission's regulations; require $10 drilling permit fee, and $1,000 bond per well.

Sponsors of the bill are Senators Charles F. Carpenter, Moline; John J. Parish, Centralia, and George C. Armstrong, Lawrenceville.

TEXAS

RAILROAD COMMISSION reports released late last week show that half of the water production of the East Texas field now is either shut in or is being injected. From only 1,927,445 bbl. in April 1941, injections rose to 4,825,313 bbl. last month, or an average of 160,844 bbl. per day. To these figures, commission engineers have added their first comprehensive report on the brine removed from production by closing so-called "water wells." Under this program, operators have shut in 262 oil wells each making 110 bbl. or more of water daily, transferring the oil allowables.

Before they were closed, these 262 wells had been removing 90,752.33 bbl. of water daily from the Woodbine reservoir, along with only 3,567.56 bbl. of oil—1 per cent of the field's usual output. It was emphasized, however, that the 90,752.33-bbl. figure is the gross cutback, since the oil allowable of a shut-in well cannot be transferred to another lease, but only to wells on the same lease, many of which produce water.

Deducting 10 to 15 per cent for brine withdrawn by wells producing the transferred allowables, leaves approximately 80,000 bbl. of water withheld from production, it was estimated. This, added to average daily April injections, makes 240,000 bbl. of water daily either shut in or returned to the Woodbine.

THE RAILROAD COMMISSION last Thursday issued the June proration order, continuing output at approximately the same rate as this month. Net allowable for crude was estimated at 1,487,709 bbl. daily, and distillate and natural gasoline at 116,000 bbl., a total of 1,603,709 bbl. daily, or 1,709 bbl. more than the petroleum administrator's certification of 1,602,000 bbl. in June. Most wells, including those of East Texas field, will produce 20 days in June.

The June allowable varies but slightly from the amount authorized by the commission in May, although the PAW certification for this month is 40,000 bbl. higher. It was explained that this situation was due to a confusion in directions from Washington. Mr. Ickes asked that Texas' output be increased 60,000 bbl. a day in mid-April to keep the 24-in. Longview-Norris City pipe line operating at capacity. Increases totaling 40,000 bbl. then were distributed among Texas fields and the same production rate figured into the May proration order. Shortly before last week's state-wide hearing, PAW notified the Railroad Commission that it had not intended to carry over the 60,000-bbl. increase into May, but the production already had been ordered.

Compared with allowables for the week ended May 15, the June order shows these changes:

District—	Allowable (bbl.)	Down (bbl.)
Southwest Texas	260,631	3,790
Gulf Coast	368,961	*4,804
East Central Texas	27,734	86
East Texas field	338,270	5,237
Outside E. Tex. field	100,212	196
West Central Texas	28,172	199
West Texas	243,727	*3,619
North Texas	122,714	242
Panhandle	98,020	793
State total	1,588,441	2,120

*Increase.

A NEW factor injected into June proration of Texas' production was a specific request for certain volumes of crude requested by PAW for delivery to Gulf Coast refineries. Selective purchasing of crude, some operators contend, is the inevitable result of meeting these PAW requests. The commission was asked to make crude available as follows: Toluene group—Houston, 261,039 bbl. daily; Beaumont-Port Arthur, 78,800; San Antonio, 40,000; PAW District 1, East Coast refineries, 13,000 bbl. daily. Aviation grade crude (naphtha group)—Corpus Christi, 69,000 bbl. daily; Houston, 12,653; Beaumont-Port Arthur, 108,800; PAW District 1, 80,500 bbl. Asphalt group—Houston, 12,400 bbl. daily; Beaumont-Port Arthur, 8,600; New Orleans, 14,000, and PAW District 1, 36,100 bbl. daily.

COMPACT RENEWED . . .

Gov. J. J. Dempsey signing the renewal membership agreement for New Mexico in the Interstate Oil Compact Commission. Watching the ceremony is John M. Kelly, secretary and director of the New Mexico Oil Conservation Commission

MICHIGAN

ALLOWABLES in the state's two largest oil fields were ordered reduced last week by the Oil Advisory Board as a measure to prevent waste, although production now is from 5,000 to 10,000 bbl. per day short of the market demand.

The Reed City and Roscommon fields, which produce about 50 per cent of the state's total output, were ordered reduced from 262 to 218 bbl. per well daily on 40-acre units and from 150 to 125 bbl. on 20-acre units.

Engineers estimated the lower production schedules would reduce the state's daily output about 4,400 bbl.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Showing of Hands Needed

WASHINGTON, D. C.—Here in the nation's capital and elsewhere in the East a ban has again been placed on pleasure driving. Motor transportation is to be reduced 40 per cent. It comes at a time when several million car owners had hoped that there would be a liberalization in the severe gasoline rationing which has applied to this area for several months.

Letters to the daily press reveal that the family owners of cars are mystified as to causes. They are now fearful as to the oil-fuel supplies for the coming fall and winter months, after they recently had been assured that it would not be necessary to undergo again the suffering and danger to health that come with inadequate heating.

It is apparent that the causes predate the temporary breaks in pipe-line deliveries from the Southwest, the news accounts of which have been tied with the latest curtailment orders. Reports here show that gasoline supplies are deficient at many points with no expectation that this situation will change soon under present operating and transportation schedules.

It is hinted that local rationing boards have been too liberal in the issuance of other than A cards so that the civilian use of gasoline has not shown the reduction expected when national rationing became effective last December 1. There are vague references to a new rationing program in the offing which will not be based on the conservation of rubber but on gasoline supplies.

In this muddle of supply and demand, it is useless to talk of remedies until there is a showing of hands by the military as to what its petroleum needs are to be and where they are to be delivered. It will come as a surprise to many that committees from the industry have been endeavoring to project petroleum demands since the war started with little definite information or guidance as to the extent of military requirements.

It is no secret in this area that most of the critical oil situations in civilian supply have come from the overnight demands of the Army which have disrupted the entire distribution program, with inefficiency in handling transportation and storage an inevitable result. The recent airing given the 100-octane schedules revealed that the Washington military administration is too far behind the battle fronts.

One hears now of a program to increase aviation gasoline production 50 to 75 per cent above the recently accepted figure for the latter part of this year. If this is correct and unless something is done to increase total production, then the aviation output will shortly become a controlling factor in the supplies that can be made available to civilians not only in the case of gasoline but all of the other principal petroleum products.

This development obviously means additional crude oil with regard to quality as well as quantity and to the point where the new production will be needed.

This is as important to the civilian economy which is supporting the war as it is to the military which is fighting it. The petroleum industry which has the direct responsibility must know in full what the demands are before it can supply them. Serious trouble is ahead for everyone concerned unless this fact is recognized and immediate and effective action is taken.

More Sedimentary Petrography Needed for Exploration and Development Programs

by W. V. Howard

THERE are many methods of studying sedimentary rocks which have a direct application to the discovery of oil fields and to their development. Like any other studies, these may be carried to an uneconomic degree, that is, the amount of information obtained may be far out of proportion to the time and expense involved in getting it.

Most of the sedimentary petrography in use at the present time may be grouped under three categories. These involve:

(a) A rapid examination under binocular microscope or a hand lens in order to detect the appearance of a key horizon or of a lithologic change.

(b) Grinding the rock or breaking it up into small fragments in order to study grain size and shape.

(c) Throwing away a large percentage of the rock and studying the remainder in great detail.

There are, of course, a variety of other studies made on sedimentary rocks such as core analysis, determination of properties by indirect methods such as electric logging, mud logging, gamma ray logging, etc. The results obtained by these methods are usually referred to rock types such as sandstone, limestone, shale, etc., but, on the whole, they cannot be said to add much to our knowledge of the rocks involved.

In examining a sedimentary rock, the geologist or engineer generally has a single problem in mind which he solves by the most direct method available and without any particular thought as to more remote applications of the knowledge he has obtained. The geologist knows of certain key beds which he uses in correlation. These tell him whether the well is running high or low. In a field they give him his casing points, tell him where to core, when he is approaching the pay, etc. Generally he does not find any use for a detailed examination of the beds.

Information provided by cores or mechanical logging methods tell the engineer much about the productivity of the sand, which is all that concerns him for the time being. Later, when he is considering the installation of secondary-recovery methods, he takes more cores and again determines the porosity, permeability and saturation of the sand. Sometimes he gets good production and sometimes the project fails to recover much additional oil. This cannot be determined by means of cores. It requires a greater knowledge of the pay than is provided by a fraction of a cubic inch taken from scattered points through the section.

The separation of the exploration and production departments in most companies causes the loss of considerable information which both could use. Some of this is obtained indirectly. For example, the nature of the connection between wells can be determined better by the behavior of the wells themselves than by any other means available to the geologist. Cases are common in which the repressuring of one well has not affected offsets but has notably increased production in a well some distance away. In many fields water appears at a definite level but in others some wells produce water at a level higher than offsets yield pipeline oil. Pressure relations are generally uniform throughout a field but sometimes they vary between offsets. There is a geological reason for all of these irregularities and this may have a decided effect on the economic operation of the property.

Sometimes the variation is due to faulting, but there is reason to believe that faulting is not so common as it appears to be according to many maps. A fault is often the simplest explanation of a condition not thoroughly understood but that does not make it necessarily the correct explanation. Sometimes variation in the sediments comprising the reservoir rock is the answer.

Recent declines in discovery rates necessitate getting more oil out of reservoirs than was formerly the rule. This, in turn, requires a detailed knowledge of the texture and composition of the reservoir. Laboratory experiments deal more generally with ideal sands than with actual pays and the principles learned there need to be interpreted in the light of actual conditions.

Sediments are not deposited in uniform layers over wide areas. Particularly relatively near shore there is much variation in the speed of currents which will deposit coarse material at one point and cover it with fine silt with, possibly, a much stronger current coming along and cutting deeply into both deposits. This variation will not show up in cores unless continuous cores through the whole pay from closely spaced wells are compared. It can be implied in many cases through compiling production data.

Some years ago, in a study of a field in West Texas, it was found that there were five definite pay streaks which extended across the structure cutting across bedding planes. The uppermost porous streak was in anhydrite on the flanks of the structure and in lime on the high, indicating seepage out from the lime pay into the anhydrite.

In another field, it was observed that there was a definite channel cutting through the top of the lime and that the best wells were those which struck a single bed of lime on the walls of this channel. Variations in initial production were found from a few to several hundred barrels and these variations were not related to structure on any horizon mapable by the usual methods of examination.

In one of these cases, detailed study of the lithology of the reservoir would not have produced fruitful results, whereas in the other case it was essential to an understanding of the field and to the projection of development.

During the development of a field, time spent on mapping the physical variations in the pay will often suggest problems which the geologist can solve with benefit to the production department. The solutions, however, are not standardized and it may be necessary to invent new methods of attack. The geologist needs a theoretical background which will enable him to visualize the possible conditions in the reservoir, but it is essential that his attack be a direct one and not result in the preparation of a long report containing much irrelevant detail which may be of great scientific but little practical value. Individual problems and suggested research procedures, both in exploration and development will be discussed in subsequent articles.

Text of Supplementary Order 8 to PAO 11

(Continued from Page 35)

which is equivalent in surface acreage to such drilling unit; and

5. Such well is drilled with due diligence to maintain a vertical well bore.

(d) **Well-spacing provisions.** — (1) **Five-acre well spacing.** — Each well drilled pursuant to paragraph (c) of this order shall conform to 5-acre well spacing only where:

(i) With respect to any such oil well which is drilled to and completed at a depth of not more than 1,200 ft.

(a) Such well is drilled on a drilling unit of not less than 5 surface acres; and

(b) Such well is drilled at least 400 ft. from every other drilling or producible well; and

(c) Such well is drilled at least 150 ft. from every lease line, property line, or subdivision line which separates unconsolidated property interests.

Ten-Acre Limitation

2. **Ten-acre well spacing.** — Each well drilled pursuant to paragraph (c) of this order shall conform to 10-acre well spacing only where:

(i) With respect to any such oil well which is drilled to and completed at a depth of more than 1,200 ft. but not exceeding 2,000 ft.

(a) Such well is drilled on a drilling unit of not less than 10 surface acres; and

(b) Such well is drilled at least 500 ft. from every other drilling or producible well; and

(c) Such well is drilled at least 300 ft. from every lease line, property line, or subdivision line which separates unconsolidated property interests.

3. **Twenty-acre well spacing.**—Each well drilled pursuant to paragraph (c) of this order shall conform to 20-acre well spacing only where:

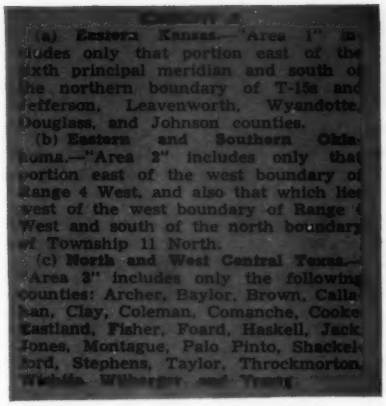
(i) With respect to any such oil well which is drilled to and completed at a depth of more than 2,000 ft., but not exceeding 3,000 ft.

(a) Such well is drilled on a drilling unit of not less than 20 surface acres; and

(b) Such well is drilled at least 800 ft. from every other drilling or producible well. However, where a well drilled prior to the date of this order is located within 100 ft. of the center of a half of a regular quarter-quarter section, a well may be drilled on the adjoining one-half of the same or of the adjoining quarter-quarter section; provided, that such well is located at least 725 ft. from all other drilling or producible wells and at least 300 ft. from the boundaries of the drilling unit upon which it is located; and

(c) Such well is drilled at least 330 ft. from every lease line, property line, or subdivision line which separates unconsolidated property interests.

(e) **Wells drilled deeper than 3,000 ft.**—Any well which is drilled or deepened to a depth greater than 3,000 ft. shall be drilled or deepened in conformity with the provisions of Petroleum Administrative Order 11 or in conformity with the provisions of any applicable exception issued in response to an application filed as provided by paragraph (g) of Petroleum Administrative Order 11.


(a) Eastern Kansas.—"Area 1" includes only that portion east of the ixth principal meridian and south of he northern boundary of T-15s and efferson, Leavenworth, Wyandotte, Douglass, and Johnson counties.
(b) Eastern and Southern Oklahoma.—"Area 2" includes only that portion east of the west boundary of ange 4 West, and also that which lies west of the west boundary of Range 4 West and south of the north boundary of Township 11 North.
(c) North and West Central Texas.—"Area 3" includes only the following counties: Archer, Baylor, Brown, Callahan, Clay, Coleman, Comanche, Cooke, Eastland, Fisher, Foard, Haskell, Jack, Jones, Montague, Palo Pinto, Shackelford, Stephens, Taylor, Throckmorton, Wichita, Wilbarger, and Young

Requirements for Pumpers

(f) **Installation of pumping or other artificial lifting equipment.** Pursuant to paragraph (c) (10) of Petroleum Administrative Order 11, any person may accept delivery of, acquire, or use material for pumping or other artificial lifting equipment to be installed on any oil well in any pool in Areas 1, 2, or 3 completed at a depth of not more than 1,200 ft.; provided, that the number of wells on the lease or tract on which such well is located to which pumping or other artificial lifting equipment is attached does not at any time exceed an average of one well to every five surface acres of the part or parts of such lease or tract which are contained within the productive limits of such pool.

(g) **Violations.** — Any person who wilfully violates any provision of this order, or who, by any act or omission, falsifies records kept or information furnished in connection with this order is guilty of a crime and upon conviction may be punished by fine or imprisonment.

Any person who wilfully violates any provision of this order may be prohibited from delivering or receiving any material under priority control, or such other action may be taken as is deemed appropriate.

Issued this 21st day of May. 1943.

R. K. DAVIES,
Deputy petroleum administrator for war.

Dorcheat-Macedonia Spacing Order Issued

WASHINGTON, D. C.—Special provisions for drilling in the Dorcheat-Macedonia oil and gas field in Columbia County, Arkansas, are provided in Supplementary Order 9 to Petroleum Administrative Order 11, issued last week.

Before the supplementary order was issued each proposed well had to be handled as an exception and permission to use material granted on an individual basis. The Arkansas Oil and Gas Commission has carried on hearings and studies on the further development of this field, and the new order represents the views of the Arkansas authorities, the operators of the field, and the PAW.

Under the new order, materials may be used and wells drilled without application for exception provided they conform to the following conditions:

1. All wells must be drilled on at least an 80-acre unit located entirely in either the north or south half of a regular quarter section. The well location must be within 150 ft. of the center of the drilling unit.

2. Where the Smackover lime is productive, wells must be drilled to and produced from the Smackover. However, if the operator desires, he may dual complete so as to produce also from the Cotton Valley formation. In lieu of the foregoing, the operator is given the option of consolidating a quarter section of 160 acres upon which may be drilled or recompleted two wells provided that such wells are located in the approximate centers of the north and south 80-acre halves and one of the wells is drilled to and completed or recompleted in the Smackover lime.

3. Where the Smackover lime is not productive, wells must be drilled to and produced from an oil sand in the Cotton Valley formation but may be dual completed, if the operator desires, in two pays within the Cotton Valley formation to produce both oil and gas.

4. Dual recompletions are provided for under the following conditions:

(a) Wells now producing only in the Smackover lime may be dual completed to produce either oil or gas from the Cotton Valley formation in addition to production from the Smackover lime.

(b) Wells drilled to the Cotton Valley formation, where the Smackover lime is not productive, may be dual completed to produce both oil and gas from the Cotton Valley formation.

5. All dual completions and dual recompletions must be so made that the production from the separate formations is not commingled in the well.

R. P. Moscrip, Shell Oil Co., Inc., Wichita, Kans., member of the advisory committee; H. W. Ladd, Tulsa, Stanolind Oil & Gas Co., new chairman of the Mid-Continent district; T. McLean Jasper, Milwaukee, Wis., A. O. Smith Corp., guest speaker; Dr. C. I. Pontius, president of Tulsa University, and Dr. George S. Benson, president of Harding College, Searcy, Ark., banquet speaker

Federal Regulations Vie With Production Problems in A.P.I. Discussions

by H. Stanley Norman

ATTENDANCE of 250 to more than 300 at every session during last week's spring meeting in Tulsa of the Mid-Continent district, Division of Production, A.P.I., is symbolic of oil men's interest in discussions and papers which may lead to greater immediate and ultimate recovery from existing fields. Floods blocked many highway and rail entrances to the convention city.

The 2-day meeting, May 20 and 21, was divided into four central themes: "Secondary Recovery," "Drilling and Production Practice," "Government Regulations and Plans Affecting Production" and the banquet.

New officers, headed by H. W. Ladd, Tulsa, Stanolind Oil & Gas Co., the new chairman, were elected and installed to conduct affairs of the district during the ensuing year.

Technical sessions were all well attended and oil men listened attentively to the various papers. The scope and caliber of discussions contributed by engineers and operators after each technical paper confirmed the interest of all in production practices, particularly in the secondary phases.

The banquet, attended by a capacity crowd, featured an address by Dr. George S. Benson, president of Harding College, Searcy, Ark., who called on oil men to take an active part in steering the nation away from a course of national socialism. His eulogy of free enterprise and denunciation of "planned economy" drew frequent applause. He credited this country's system of free enterprise with the fact that it controls half of the world's total wealth, although possessing only one-sixteenth of the population.

In the pages immediately following are presented liberal extracts from the discussion of Frank Watts, director of materials for PAW, anent the new materials order, P-98-b, amended, which was a feature of the Tulsa meeting. Other A.P.I. material in this issue includes an account of gas repressuring at Glenn Pool, starting on page 45; a study on efficient rate of production, on page 58, and a discussion of the joint use of production facilities and manpower, on page 70. Other A.P.I. technical papers appeared in last week's issue.

Failure of China to benefit through centuries of existence was blamed on the lack of protection for free enterprise. Dr. Benson pointed out that in China labor is abundant, natural resources are plentiful and that a few nationals had amassed huge fortunes. Still, he said, all of the attributes to a wealthy and progressive nation had been stifled because capital had been driven into hiding by lack of protection. Industry was criticized for failure to expound the virtues of a free capitalistic system. Most of the danger from spot polls which show about 25 per cent of the public in favor of a planned economy with another 34 per cent undecided comes, Dr. Benson said, from "false propaganda" which purports to paint a brighter future without telling the whole story. Propaganda, Dr. Benson said, was responsible for the collapse of the republican forms of government in Athens and Rome and warned that a similar failure in this country is possible unless measures are taken to arrest the trend.

End of the war will be the most critical period in the history of this democracy, he cautioned, and added that provision must be made by industry to absorb 7½ million men from the armed services and "I hope," he added, "another 2 million now on government pay rolls."

T. McLean Jasper, A. O. Smith Corp., Milwaukee, Wis., speaking on "New Frontiers in Metallurgy" at the Friday afternoon session, advised engineers to consider the lighter metals, aluminum and magnesium and the plastics, in proportion to their capacities. He said that the load carrying qualities of steel will continue this metal in certain services indefinitely. He referred to some of the limiting factors such as economics, weight, and other physical qualities as permanent bars to the use of lighter metals in a vast field of services. The metal-

Herbert Goodpaster, Phillips Petroleum Co., Great Bend, Kans., retiring general chairman of the district and new chairman of the advisory committee; P. H. Bohart, Gulf Oil Corp., Tulsa, who presided at the banquet; Carl A. Young, Dallas, Tex., secretary of A.P.I. Production Division; R. B. Saxe, Gulf Oil Corp., Pampa, Tex., retiring vice chairman for Panhandle and member of advisory committee

lurgist referred to a new development in airplane propellers which will permit 5 per cent greater speed or 8 to 9 per cent greater range.

The question was raised by W. B. Berwald, Tulsa, Ohio Oil Co. engineer, following a paper on the gas repressuring of Glenn Pool, Oklahoma, whether even more favorable results would have obtained if the return of gas had been started earlier in the life of the field. He also raised the point of whether unitization of Glenn Pool properties would have been preferable to the joint operating program under which the repressuring work there is being carried out. K. B. Barnes and J. F. Sage, Tulsa, engineers for Gulf Oil Corp. and Sinclair Prairie Oil Co., respectively, coauthors of the Glenn Pool paper, agreed that complete unitization would have been preferable. However, they cited the accomplishments there as evidence of what can be done in old fields where diverse ownership presents handicaps that would severely delay repressuring or even make such a program permanently impossible if unitization is made a prerequisite.

Much discussion followed the paper by Frank A. Watts, director of the Materials Division, PAW, Washington, D. C., on operation of Preference Rating Order P-98-b under the Controlled Materials Plan. An effort was made to more clearly define certain terms used in the order. For instance, an "item" consists of all identical elements included in the same order, such as one or more valves in an order having the same specifications or one or more joints of pipe. In defining a "job," Mr. Watts said that all of the steps taken in drilling a well would be regarded as part of one project. However, the installation of the tanks for handling oil produced by the same well would be another "job" under PAW interpretations.

Mr. Watts particularly emphasized the necessity of spreading delivery of quarterly material requirements as equally as possible throughout the 3 months. He said that production jams were precipitated in mills and that scheduling conflicts with other critical industries were aggravated by packing shipping instructions into a single month on materials intended to last an entire quarter.

A strong plea that engineering and purchasing departments of oil companies adopt A.P.I. specifications and methods of describing standard equipment was made from the floor after Mr. Ladd, superintendent of materials for Stanolind, completed his paper on "Maintenance of A.P.I. Oil-Field Equipment Standards." Mr. Ladd outlined the active participation of A.P.I. committees in functions of the War Production Board and other agencies seeking to minimize the types of various equipment items manufactured for the petroleum industry. The speaker warned, however, that changes in specifications have far-reaching effects and that none should be made until fully studied by qualified representatives of the industry.

Dr. E. F. Miller, pastor of the Presbyterian Church, Tulsa; H. F. Beardmore, Amerada Petroleum Corp., Tulsa, new vice chairman for Oklahoma and retiring secretary-treasurer; Frank E. Bernsen, president Lucey Products Co., Tulsa, chairman of the banquet committee, and John R. Evans, chief engineer, Stanolind Oil & Gas Co., Tulsa, member of advisory and program committees

How P-98-b Works Under CMP

*by Frank A. Watts**

The paper, of which this is a slight abridgement, was presented at last week's meeting in Tulsa of the Mid-Continent district, Division of Production, A.P.I. The author explains that P-98-b, for all practical purposes, establishes the only allotment and preference rating procedures which are available to the petroleum industry. Here he tells how the order applies and outlines the procedure for all classes of operators in the oil industry.

COMMENCING with July 1 and thereafter the distribution and use of all materials, made in whole or in part of controlled materials, will be directly or indirectly regulated by the Controlled Materials Plan. Commencing with July 1, all producers of controlled materials will be prohibited from selling or delivering any controlled materials unless the person acquiring the material assigns an allotment number to the producer at or in advance of the time the material leaves the producer. Preference Rating Order P-98-b as reissued May 15, 1943, is designed to meet these conditions and to provide petroleum-industry operators with a program which will periodically enable them to obtain allotment numbers and preference ratings, where either or both of these are required for essential operations.

Let's first consider materials required for maintenance and repair purposes and as operating supplies. These are commonly referred to as MRO. Every operator and every service company operating under P-98-b requires these in varying quantities at one time or another. For simplification capital investment material costing $500 or less for any single project or job is interpreted as being maintenance and repair material.

When a supplier, manufacturer, or producer requires a preference rating for items of material which are being acquired for maintenance and repair purposes or as operating supplies, P-98-b provides an AA-1 preference rating for the operator's use. It is necessary that the symbol MRO-P-98-b and the preference rating AA-1, with the already well known and now standard certification, be placed on the purchase order or contract by the operator.

Small Purchases Exempt

When the value of the materials included on any single purchase order or contract is less than $100, there are no other restrictions which affect the operator's use of this symbol and preference rating. The symbol MRO-P-98-b is equivalent to an allotment number and gives any purchase order carrying this symbol an identical standing with AA-1 rated purchase orders carrying allotment numbers.

When the materials purchased on a single purchase order or contract cost $100 or more, but cost less than $1,000, and every item on the purchase order or contract costs less than $500, the production operator, in using the symbol MRO-P-98-b and the AA-1 rating, is required to send one copy of the purchase order or contract to the PAW office for the district in which production operations are being or are to be performed. Operators, other than production operators, may send the purchase order copies to either the PAW district office in which operations are being performed or the district in which purchase orders are being issued.

Value Regulates Procedure

Where the cost of all items on the purchase order totals $1,000 or more and, provided each item on the purchase order costs less than $500, two copies of the purchase order must be submitted to PAW by the operator. Where every item on the purchase order costs less than $500 all operators, other than production operators, must send the two copies of the purchase order to the PAW district office in which the operations are to be or are being performed, or the district in which the operator issues the purchase orders. If the cost of any one item is $500 or more these operators will send in duplicate those purchase orders which include such items to PAW in Washington, regardless of the total cost of the material included in these purchase orders. In either case, production operators are required to send the two copies of such purchase orders only to the PAW district office in the district in which the operations are being or are to be performed. In all these instances the operator is not authorized to use the allotment symbol MRO-P-98-b and Preference Rating AA-1 until one copy of the purchase order, carrying PAW's authorization, has been returned to the operator. The duplicate copies of these purchase orders are retained by PAW to assist them in determining and representing the petroleum industry's future needs for materials.

Part 1 of Schedule D of the order makes it unnecessary for any domestic purchaser of rotary bits, regardless of the total value of the purchase order or the cost of any one bit, to submit copies of purchase orders to PAW for authorization purposes. In any event no copy need be submitted to PAW for bits if the purchase order cost is less than $100. When the total cost of bits included on one purchase order is $100, one copy of the order is sent to the PAW district office for statistical purposes.

Control on Critical Materials

There are a few items of material for which the manufacturing facilities are not now sufficient to fill all war orders and which are critically needed in the construction of the 100-octane aviation gasoline plants and other war plants. Part 2 of Schedule D of Order P-98-b makes it necessary when the total value of any one of these items on a single purchase order is $100 or more, to send two copies of the purchase order or contract for certification to the applicable PAW district office and to obtain authorization to place a purchase order or contract for these critical items. The list includes "cast iron valves over 12 in.", "industrial control instruments including relief and control valves and regulators" and "steel valves."

Those are briefly the principal steps to be taken by a petroleum industry operator, to the extent P-98-b applies, in using allotment symbols and preference ratings to secure maintenance and repair materials or operating supplies.

Procedures controlling the acquisition and use of material for construction operations in the petroleum industry have been considerably simplified in the new P-98-b order. These general comments will serve as a guide. Procedures to be followed by production operators will be discussed later.

A natural-gasoline plant operator is required under PAO-11 to file PAW Form 4 to perform a construction operation. Refining and transportation operators, desiring to perform a construction operation with materials which are primarily on hand and the estimated cost of all material is less than $3,000, are authorized under P-98-b to perform such construction

*Director of materials, PAW, Washington.

operations without further ceremony. Authority to perform refining or transportation construction operations where the costs exceed this authority, may be obtained by using the familiar PD-200 or PD-200-B forms.

Marketing, natural-gasoline production, refining and transportation operators whose proposed construction operations are such that they require an allotment number, or preference-rating authorization, or both an allotment number and a preference rating, are required to prepare Form PD-200 or supplemental Form PD-200-B. A recent additional delegation of authority to PAW will reduce the time of processing PD-200 applications and issuing authorization certificates to a maximum average of 14 days. Three months ago this average was 38.74 days. More recently this time was cut to an average of 25.6 days. Under the present program it will be possible to cut the average time to 14 days, perhaps even to 10 days. The time has already been cut to 17.2 days. In urgent cases it will be possible to process applications and issue certificates in 1 week or even less time. The preference rating and allotment number which will be assigned to an operator for construction projects through Form CMP-4C is the allotment number to be used for controlled materials as well as the preference rating, or the allotment number and preference rating to be used for other than controlled materials which have been authorized on the returned PD-200 application for the specified construction project.

Provision for Gathering Lines

The laying of all oil-gathering lines with material costing less than $2,500 up to a trunk line or pump station are now defined, by PAO-11, as being production operations and are so classified by P-98-b. It is no longer necessary, therefore, to file PD-200 applications for the material required for such lines in parallel cases. Natural-gas gathering lines up to the first compressor station or natural-gasoline plant are production operations and it is unnecessary to file PD-200 applications for material required for these. Materials required for both oil and natural-gas gathering lines are obtainable under the program which will be next outlined for production operations.

When a petroleum-industry operator, other than a production operator, requires a single item of capital-investment material or equipment which is not obtainable as MRO under P-98-b or as part of a previously authorized PD-200 project, the operator files a PD-200 application for that single item with the Washington office of the PAW. This was formerly accomplished by filing a PD-1A application. This type of a PD-200 application will be processed by the same routine and with the same or even

FRANK A. WATTS

greater dispatch than PD-1A applications were formerly handled.

In securing material for discovery, development or depletion operations, the following procedures must be followed: An operator who drilled more than 40,000 ft. of hole during 1942 is required to fill out Form PD-783 4 months in advance of the quarter in which 1943 or later drilling operations are to be performed. There are approximately 100 such operators. In round figures, their requirements will constitute 50 per cent of the 1943 tubular goods and other controlled materials required by the production operators of the petroleum industry. For some time these operators have been accustomed to planning their operations well into the future and scheduling the delivery of material for these operations and maintaining modest and balanced inventories for these planned operations. To the extent that requirements are known, or can be determined, or estimated within reasonable limits, all other production operators should file their PD-873 applications at this same time.

Form PD-873 Important

Form PD-873 is to be prepared by production operators, by PAW districts and filed in the PAW office for the district in which operations are to be performed. Spaces are provided on this form for listing the operations which are to be performed, the wells which are to be drilled, when the wells are to be drilled, and the controlled materials required for these activities. An allotment number is then assigned by PAW for use in purchasing all, or an authorized portion, of the specified controlled materials including oil-country tubular goods. A preference rating is also assigned by PAW and this rating—and the allotment number—are for the operator's use during the quarter, or any shorter period for which a PD-873 may have been filed, for purchasing capital-investment materials required for use incidental to the operations described in the space provided on the form. These operations may or may not be directly related to the well or wells for which the controlled materials are to be obtained.

All arrangements have now been completed for the establishment and maintenance of mill stocks of oil-country tubular goods. These stocks will be available during the third quarter of this year for general use by all operators who during 1942 drilled less than 40,000 ft. of hole, and to fill the emergency needs of operators who during 1942 drilled more than 40,000 ft. of hole. These emergency needs include such requirements as wells which could not be planned when the quarterly PD-873 applications were filed. A special series of allotment numbers will be used by the district offices of PAW for orders which are to be filled from these mill stocks. This program will make it unnecessary for those operators who, during 1942, drilled less than 40,000 ft. of hole, to file a PD-873 application for oil-country tubular goods much more than 30 days in advance of the time the drilling operations are to be performed. However, to the extent these are able to determine their future requirements, they should file their applications 4 months in advance of the quarter during which operations are to be performed.

Arrangements for Field Stocks

All arrangements, other than a detail or two, have now been worked out whereby small field stocks of oil-country tubular goods will be established and maintained. It is hoped that these stocks will be available during July, the first month of the third quarter of this year. These stocks will be available for all wildcat operations whose operators do not own or control material with which to conduct these wildcat operations and, in addition, these field stocks will be available to fill the unpredictable emergency needs of all operators. Included as emergency needs are such cases as tubular goods required by the operator who requires a few joints to complete a string, a few joints to go to a deeper horizon, or finds the regular pay to be deeper than contemplated, or encounters an unexpected water or gas sand. Authorizations to place orders against the field stocks will be obtained from PAW office of the district in which the operations are being or are to be performed. These authorizations will carry a special series of allotment numbers which will be obtained by filing the Form PD-873 application.

Both field and mill stocks of oil-country tubular goods are to be rotating stocks. The allotment number assigned to and used by the operator in obtaining materials from either

field or mill stocks will be used by the distributor or mill in replacing these stocks.

In all these cases the preference rating assigned to the operator by PAW, at the time PD-873 allotment number authorization is obtained, may be used by the operator in purchasing capital-investment materials for the operations which the operator has described on Form PD-873.

Those operators who do not file a PD-873 application for controlled materials in advance of the quarter in which drilling operations are to be performed, and those operators who require capital-investment materials, other than controlled materials, for operations not described on a previously filed Form PD-873 application and whose capital-investment material requirements exceed the $500 amount permitted under the MRO provision of Order P-98-b, must file a PD-873 application for an allotment number and preference rating in advance of the time these capital-investment materials are required by the operator. All these Form PD-873 applications are to be filed with the PAW office in the district in which operations are to be or are being performed.

Each application must broadly or specifically identify the operations in connection with which capital-investment materials are or may be required. The allotment number and preference rating which will be assigned by PAW will be for the operator's use in purchasing any capital-investment materials which are required for use in connection with the described operations and which materials are to be acquired during the quarter, or shorter period, covered by the authorization.

It is unnecessary for operators to send to either the Washington or district offices of PAW copies of purchase orders for controlled materials which are allotted to an operator on PD-873, or CMP-4C, or other allotment certificate.

Purchase orders need not be submitted where acquisition of any material for the construction operations of a production operator is authorized through the PD-200 project application route. There are, however, instances when a production operator must submit purchase orders for authorization in purchasing material other than controlled materials.

After preference rating authorization has been received by an operator and capital-investment materials are required during the period covered by Form PD-873, for use in connection with operations which are described on the form, and the total amount of material covered by any purchase order or contract is less than $100 in value, the operator is automatically authorized to use the preference rating and, if necessary, allotment number which has been assigned by PAW. Copies of these purchase orders are not sent to PAW either before or after the purchase is made.

When the total value of all items covered by any purchase order or contract is $100 or more but less than $1,000 and every item on the purchase order costs less than $500, the operator is authorized to use the preference rating assigned by PAW on Form PD-873 after sending one copy

(Continued on Page 116)

DEATHS

James Flynn Dillman, 24, oil worker of Salem, Ill., was killed last week when he became entangled with high-tension wires and was electrocuted. He was an employe of Fred DeMier Drilling Co. Mr. Dillman moved to Salem from Oklahoma 3 years ago.

Jack Walton, 70, retired oil-field driller, died in Ponca City, Okla., last week. He went to Ponca City from Blackwell 8 years ago. A son and two daughters survive.

Early Davis, 72, retired oil-well driller, died last week at his home in Canyon, Tex. His widow, three sons five stepsons, three daughters and a stepdaughter survive.

Samuel P. Alcorn, 66, died last week at his home in Wooster, Ohio. One of the best known oil men in Ohio, Mr. Alcorn had been associated with the Preston Oil Co. for 33 years as field superintendent. Surviving are his wife, Mary, one son, Harold W., and six brothers and sisters.

James J. Johnson, 58, president of Johnson Oil Refining Co., Chicago, died of a heart attack May 8 at his home in Wilmette, Ill. He was the third brother, each the head of the company, to have died from the same cause in recent years. He had been associated with the Johnson Oil Refining Co. since its organization in 1909. The company operates refineries at Chicago Heights, Ill., and Cleveland, Okla. He was also interested in the Central Refining Co., Lawrenceville, Ill., until its sale in 1920 to Indian Refining Co., now the Texas Co.

Harry Burnett Records, 64, oldest employe in point of service of the Springfield, Ohio, office of the Ohio Fuel Gas Co., died last week. He had been with the company 44 years.

Oliver A. Wurmser, pioneer oil-field drilling contractor and producer, died at Bartlesville, Okla., last week. Mr. Wurmser went to Bartlesville from Ohio in 1908, and retired in 1930. His widow, a son and a daughter survive.

George L. Dobie, 69, for more than 25 years manager with Heydrick Mapping Co., Wichita Falls, Tex., died in that city last Sunday evening. Mr. Dobie was born in Titusville, Pa. Interment was at Fredonia, N. Y. Mr. Dobie is survived by his widow and four sisters.

Joseph C. Trees, 73, partner in the firm of Benedum & Trees, Pittsburgh, Pa., died of a heart attack last week while he was discussing business in his office. Mr. Trees was born in Trees Mills, Pa., in 1869. After a short period spent in teaching school, he enrolled at Indiana Normal School, and later at the institution which became University of Pittsburgh. He was a football star at the latter institution. He obtained a summer vacation job with Standard Oil Co., and it was here that he met M. L. Benedum. The two decided to buy a lease for themselves, and this started them on their partnership. In the years that followed they drilled in West Virginia, Rumania, Illinois, Texas, Oklahoma and South America. Mr. Trees, in addition to being vice president of Benedum & Trees, was officer or director of numerous oil companies. His widow and a son survive.

A. D. Doyle, 72, retired oil-field worker, died in a Wichita Falls, Tex., hospital. Mr. Doyle lived in Burkburnett, Tex., and it was there that he was interred. His widow survives.

William O. Beall, 72, retired counsel of Sinclair Prairie Oil Co., died in a Tulsa hospital May 21. Mr. Beall had lived in Tulsa since 1918, coming here from Muskogee, Okla. Mr. Beall was born at Washington, D. C., and was educated at Columbian (now George Washington) University. He came to Indian Territory in 1896, and was employed by the U.S.G.S. as a topographer. He participated actively in oil and gas legal problems considered by the Mid-Continent Oil and Gas Association. His widow survives.

Eugene L. Harrison, 75, independent oil operator of Humble, Tex., died May 22. He leaves his wife, five sons and one daughter, all of Houston, Tex.

E. F. Woodward, wealthy oil man and sportsman, of Houston, Tex., was fatally injured Saturday, May 22, in an automobile accident which caused the death of his wife. Their car collided with a Southern Pacific freight train. Mr. Woodward died May 24 at a hospital in Hondo. Before taking up horseracing, in which he became nationally known, Mr. Woodward was one of the world's top-flight trapshooters. When he was 11 he went to work pumping wells for Carter Oil Co. in Pennsylvania. As a driller or superintendent he worked in oil fields of Oklahoma, Texas, Louisiana, Arkansas, Ohio, and Pennsylvania. With the late T. P. Lee, of Houston, and the late Frank Yount, of Beaumont, Mr. Woodward organized the Yount-Lee Oil Co., which found deep oil at Spindletop

GAS REPRESSURING AT GLENN POOL

by K. B. Barnes and J. F. Sage†*

ABSTRACT

Glenn Pool was the first major oil pool in Oklahoma. Original development took place mainly during 1906-1909. Peak production has been reported as 117,400 bbl./day in June 1907.

The southern portion of the pool covering 8,100 acres is the most prolific sector. The North Extension area covers 8,400 acres. Oil production and well completion records for early years are very incomplete. However, it is believed that southern sector has recovered at least 25,000 bbl. per acre to date while recovery from North Extension has been about 4,000 bbl. with total for entire reservoir in the order of 222 to 236 million barrels. The reservoir is of gas expansion type and the southern sector contains an unusually thick section of oil sand.

Systematic gas repressuring or "gas drive" operations were started in May 1940, and very successful results obtained. By April 1, 1943, the repressure effort had been expanded to cover work done by seven companies on 18 leases, with a total of 2,000 acres partially under repressure operation. A total of 308 old oil wells are being affected, while 51 new oil wells and 65 new input wells have been drilled. The production of these projects was 714 bbl./day before repressuring. During March 1943 the average production was 1,893 bbl./day, or an increase of 1,269 bbl. An average of 1.42 tons of steel, in majority consisting of second-hand lightweight casing, was used per barrel per day of increased oil rate.

This article was presented as a paper before the meeting of the Mid-Continent district, A.P.I. Division of Production, at Tulsa, May 20-21.

THE principal oil-producing horizon of Glenn Pool is the Bartlesville sand, locally designated as the "Glenn" sand. Other formations which have produced minor amounts in small, localized areas within the pool are the Red Fork, Taneha, Dutcher (mostly gas) and Wilcox.

The accumulation of oil at Glenn Pool is due, in broad viewpoint, to the Glenn sand thinning or pinching out updip into shale to the east and north. This wedge or pinchout formed a stratigraphic trap, the detailed nature of which has been discussed by Wilson.[1] However, within the extent of the trap itself there is one large area which contained a greater thickness of clean sand, and of greater permeability and porosity. This more prolific oil production area, the northwest part of Township 17n-12e, is located approximately midway between the pinchout to the northeast and the occurrence of edge water downdip to the southwest and commonly is designated as "Glenn Pool." Northward thickness of clean oil sand and permeability and porosity become less and that producing area (the southwest portion of Township 18n-12e) usually is designated as "North Extension." Actually "Glenn Pool" and "North Extension" are one common reservoir.

The situation is shown by the isopach map of the pool and the surrounding territory (Fig. 1). The isopachs are constructed on the basis of total thickness of Glenn sand from top to base. It will be noted that to the south and west of "Glenn Pool" the total thickness is in excess of 100 ft., while to the northeast it diminishes to negligible amounts or total absence.

Because of the lack of detailed sand records for the original wells, a detailed stratigraphic and lithologic picture of the oil productive zones or "pay" units of the entire reservoir cannot be made at this time. Sufficient core analyses, electric logs, and drill cuttings from recent wells are available, however, to reveal that the reservoir is not one simple large sand wedge, thinning updip to the north and east. Rather, it is a complex series of sand layers, each varying laterally rather widely in physical character and present state of oil and water saturation.

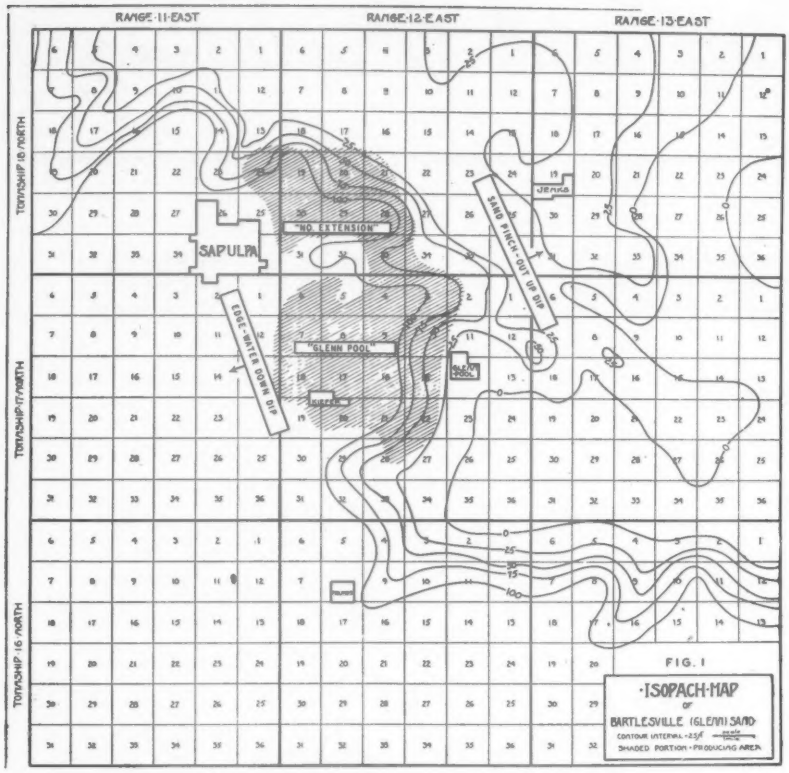
Available past production records do not reflect any close relationship between past productivity and structural position. Originally there may have been a number of small gas caps on local structural features. For example, recent core analyses have indicated the remnant of a small gas cap of approximately 40-acre size located approximately in C S½ 9-17n-12e. Such condition might have been inferred from the original records which showed casing landed about 50 ft. into the sand. Presumably this was for the purpose of shutting off gas. The core data here show the upper part of the sand to contain very little oil. No doubt other small gas caps, unusual shale and siltstone breaks, local water intruded areas, etc., as well as the major item of lateral variance of the sand layers or pay zones, will be found locally throughout the pool.

Past Production Data

From available information it is believed that the original bottom-hole pressure was approximately 600 lb./in.[2] Since local gas caps existed, it is evident that the crude oil originally was completely saturated with gas, possibly about 350 cu. ft. per barrel. At the present time the gravity of the crude oil is 36° A.P.I., and the viscosity about 5 centipoises. The bottom-hole temperature is 84° F.

The amount of crude oil which has been produced from the pool is not accurately known. One estimate is that the oil recovery to date is approximately 222 million barrels. In all probability this figure is the minimum. It is somewhat lower than that suggested from the productive acreage and the minimum average recovery per acre indicated for "Glenn Pool" and "North Extension" from

*Gulf Oil Corp., Tulsa.
†Sinclair Prairie Oil Co., Tulsa.



available production figures for a number of leases well distributed through the reservoir:

Area—	Estimated average recovery bbl./acre	No. of prod. acres	Accumulated oil prod., bbl.
North Extension	4,000	8,400	33,600,000
Glenn Pool	25,000	8,100	202,500,000
Total			236,100,000

A few properties, where the production data since either early or original completion are available, have had recoveries as follows:

GLENN POOL

Location—	No. of prod. acres	Prod. record commences	Accum. prod. bbl./acre to 1-1943
17-17n-12e	160	1907	23,300
17-17n-12e	160	1907	25,600
21-17n-12e	160	1907	11,200
15 and 22-17n-12e..	160	1907	31,600
8 and 9-17n-12e	100	1907	43,000
8 and 9-17n-12e	160	1907	28,500
7-17n-12e	72.5	1907	26,800
4, 8 and 9-17n-12e.	120	1908	22,400
5 and 6-17n-12e	80	1907	30,100
10-17n-12e	20	1907	48,300
20 and 21-17n-12e..	160	1909	14,300
16-17n-12e	80	1907	33,300

NORTH EXTENSION

24-18n-11e	90	1909	7,800
20-18n-12e	120	1909	5,100
3-17n-12e	120	1908	3,900
21-18n-12e	70	1908	4,800
20-18n-12e	80	1909	6,100
10-17n-12e	80	1909	4,200
28 and 29-18n-12e.	160	1910	2,800
29-18n-12e	70	1910	4,200
10-17n-12e	40	1909	5,800
19-18n-12e	60	1909	6,900
19-18n-12e	60	1909	5,800
20-18n-12e	70	1909	8,600
20-18n-12e	80	1909	4,700
20 and 34-18n-12e.	80	1909	8,900

The first wells were completed in the latter part of 1906. A vigorous drilling campaign was carried on during 1907 and 1908. Peak oil production of 117,440 bbl./day has been reported for June 1907. At most of the wells the sand was shot heavily and the wells flowed naturally at rates from 500 to possibly 4,000 bbl./day during the first few months after completion. By early 1909 it is believed that the large majority of wells were produced by pumping. In 1912 the first gasoline plants were installed and widespread vacuum was applied by 1914. By 1915 or 1916 the gasoline plants were gathering the gas at as much as 20 in. of vacuum. Present-time vacuum application at "Glenn Pool" is as high as 26 in. and a strong underground vacuum exists in the reservoir.

Start of Repressuring

Some experimental air and gas injection attempts were made during 1927-1928, with old oil wells used for input; the results were largely unsuccessful. It is believed that the input gas quickly channeled through the upper pay section which was exposed in the heavily shot holes.

In May 1940, the first carefully designed pattern type repressure project in the pool was commenced on the L. R. Kiefer property, the SE 17-17n-12e, by Sinclair Prairie Oil Co. The lease had a settled oil production of 61 bbl./day. Five individual five-spot patterns consisting of 5 input wells and 16 oil wells (4 were old oil wells) were drilled within the lease. Nine input wells also were drilled along the lease boundaries. Oil production rose rapidly and by the end of the year was 300 bbl./day. Repressuring on other nearby leases was followed by Sinclair Prairie, N. V. V. Franchot, Gulf, L. B. Jackson, Jr., Tide Water Associated, and Weber Oil Co. Whitehill Oil Corp. continued a repressure project located northward from the central part of "Glenn Pool."

Drilling and Completion

The wells are drilled with portable cable-tool machines. A 10-in. hole is drilled to about 275 ft. where a string of 8⅝-in. o.d. casing is set permanently to shut off a shallow fresh water sand. Open hole drilling of 8-in. size is continued to the top of the Glenn sand where, for oil wells, the hole is reduced to 6 in. through the productive section. The producing formation is shot with 250 to 300 qt. of nitroglycerin, casing is run to the top of the sand, and the shot hole cleaned out.

In the completion of the input wells the procedure is the same until the top of the Glenn sand is reached. At that point the sand is cored either with cable tools or portable rotary core drill. Either coring method usually yields excellent recoveries. A more detailed analysis can be made of the rotary cores, however, little difficulty has been experienced in obtaining sufficient test samples from the cable-core biscuits for a sufficiently complete analysis.

Considerable effort has been made to improve coring procedure at Glenn Pool since the first core test was made. Originally a bentonitic-type coring mud was used, but later it was found desirable to employ a mud which has an A.P.I. filtrate loss of less than 1 cc. One barrel of this mud is obtained by mixing ingredients with fresh water:

Low-filtrate-loss coring mud.—20 to 25 lb. starch-type mud material; 15 lb. bentonitic mud material; 2.5 to 3 lb. sodium hydroxide; 10 to 20 lb. barytes.

The mud has a pH of about 12 to 12.5. Any filter cake remaining on the face of the sand later can be removed by washing down with a hydrochloric acid solution.

No attempt has been made to repressure the upper pay zone, which generally has comparatively poor oil saturation, except in a few instances not in the central part of "Glenn Pool." The input wells are cased through to the top of the main pay zone which is determined from core analyses, electric logs, or by examination of the well cuttings. Casing of 7-in. or 5-in. o.d. or 4-in. line pipe is used for the injection strings, and is cemented with 25 sacks. The upper pay zone later can be opened for secondary-recovery attempts by gun

perforating, in which case the casing will provide a good contact for packer shutoff. A few of the input wells have been cased on top of the Glenn sand and a packer set at the main pay zone to exclude gas injection from the upper section.

An important phase of the operations is in cleaning out or deepening the oil wells in order that all of the oil sand open to the gas drive will be exposed for production. In the original drilling a large number of the wells only partially penetrated the sand. For a number of years at Glenn Pool it has been profitable to deepen such wells in order to expose additional sand. Deepening of any wells of shallow penetration on a repressure project usually is done at an early date in order to obtain full benefit of the gas injection. Likewise, it also is desirable to keep the wells free from cavings since the repressuring has not built up sufficient head so that satisfactory production can be obtained unless the wells are pumped from very close to bottom.

Well Spacing

The well spacing or "pattern" of input well locations relative to the oil wells has been varied. In general the size of repressure patterns which has been used can be, in comparison with operations elsewhere, classified into those of close and those of moderate size. Originally much of Glenn Pool was drilled on a basis of nine oil wells to 40 acres, although on a large number of properties no drilling was done except along the lease lines. If the nine wells to 40 acres arrangement for oil wells is continued in the repressure work, it is possible to drill five new gas input wells within a 160-acre pattern so as to form four alternate "five spot" patterns. Some of the projects in Glenn Pool have followed this well-spacing arrangement, as illustrated under (a) in Fig. 2. More five spots can be formed on the 160 acres by drilling additional input wells and correspondingly obtaining a direct drive of the gas over more area.

Other projects have followed spacing patterns of greater size, and with a greater percentage of the total area receiving a direct drive from input to oil well. One 160-acre property, which previously had oil wells only along the lease boundaries, was developed by drilling additional oil wells and input wells within the least to form five repressure patterns and which resulted in a direct drive to the oil wells over virtually all of the area. This pattern is shown by (b) in Fig. 2.

The pattern layout of other projects has varied in size from 5 to 26 acres per individual pattern. If the well spacing is not to be close, considerable variation in shape may be necessary on irregularly drilled properties to avoid plugging some of the existing wells. One example of a successful but rather irregularly shaped pattern layout is shown by (c), Fig. 2.

Sufficient time has not elapsed to determine all of the relative economic and operational merits of the different well-spacing patterns that have or could be employed at Glenn Pool. The small patterns entail a greater development cost per acre exposed to direct gas drive. It is not yet determinable whether the smaller-sized patterns will be conducive to better repressure control, and will yield greater ultimate recovery.

Some projects which have consisted of fewer but larger-sized patterns have obtained oil-production rates as high or higher than other projects of equal total area but which have employed a larger number of smaller-sized patterns. The total rate of gas injection in these instances has been about the same. However, the variation of the average oil and input-well density among these projects has not been sufficient to indicate definitely at this time that greater efficiency in repressure control and recovery can be attributed to any one pattern in use.

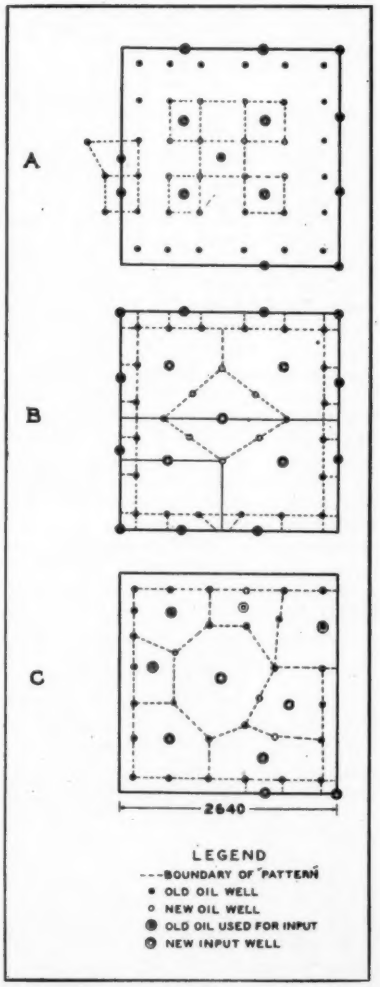


Fig. 2—Types of repressure patterns

Gas Injection

For one group of Glenn Pool projects a separate gas-injection system was constructed from a compression-type gasoline plant that has been in operation for many years. Additional gas for the system has been purchased. For another set of projects, small compressor plants have been constructed on various leases. The compressor unit has two single-stage cylinders, one for air and one to gather and compress casinghead gas. The compressed air and gas are comingled in discharge lines to the input wells. Due to scarcity of gas the compressor units are driven by electric motors. Two projects in the pool are served by air compressor plants. In the main, however, the repressuring is being done with natural gas.

For an individual repressure pattern of small size, covering 2.5 to 3.5 acres, injection rates of 25,000 cu. ft. per day are used. For a larger pattern where an input well serves territory from 10 to 25 acres, current injection rates are 40,000 to 60,000 cu. ft. per day and will later be increased. The injection pressure ranges from only 5 to 50 lb. per sq. in except for one project middistant between "Glenn Pool" and "North Extension," where it is 225 lb. per sq. in.

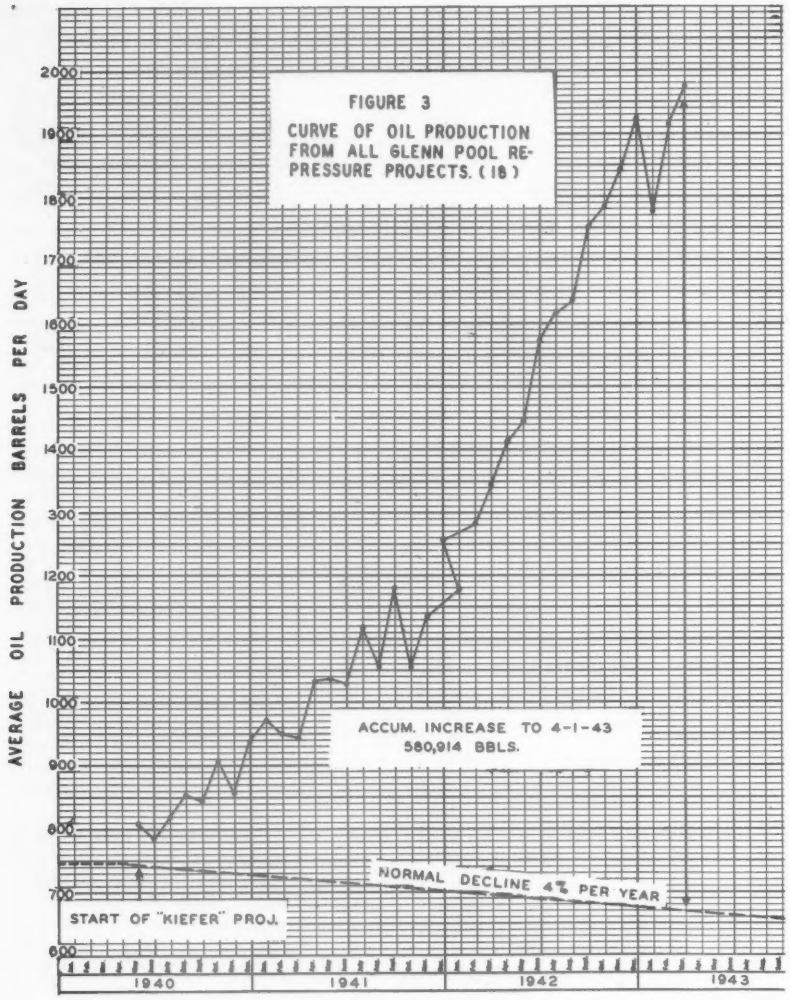
Gas injection to new input wells is started slowly, at 5,000 to 10,000 cu. ft. per day, and the rate gradually increased to the desired amount within 1 to 2 months' time. A recording orifice meter with 7-day clock is set at each input well and operated during the first few months until the desired injection rate becomes constant. Subsequently, the recording meter is removed and weekly spot checks made to control the input to the desired rate.

Gas Production

Considerable effort is made in the "pattern" type of repressure operation employed at Glenn Pool to limit the gas withdrawals to equal amounts as between each of the oil wells affected by an input well. It is believed that care in obtaining equal withdrawals will do much in securing uniform and equal movement of gas to each oil well within a pattern and preventing premature channeling of the drive.

Control of gas withdrawal from individual oil wells is accomplished by installing a cock in the gas-gathering line from each oil well. The flow of gas through the cock or adjustable valve is determined once each week with a portable indicating orifice meter, and any necessary adjustments to obtain the desired withdrawal are made.

With the intensive pattern-type of repressure operation in use at Glenn



Pool, and with existing diversification of leasehold ownerships, considerable opportunity is possible for the drilling and operation of joint-interest wells along lease boundary lines. Such "line" input wells will affect substantial amounts of oil sand that otherwise would remain virtually dormant and would produce very little oil due to lack of effective gas drive. Full advantage has been taken of this situation and to date 23 input wells have been drilled by five participating companies on lease boundary locations. In some cases the completion and operating costs on such input wells are shared by the participants, in others the cooperators have "swapped" input wells, that is, each drills and operates equivalent line input wells.

Sometimes the well spacing or pattern arrangement between leases has been such that new oil wells are desirable at the lease boundaries between two properties of different ownership. To date, three new oil wells have been drilled on lease lines, with arrangements made with the royalty owners and between the operators to account for the oil produced. The production is sufficient to justify the separate tankage and gaging necessary.

Exchange of sand and core records, oil and gas production and gas-injection data, and other pertinent information to conduct efficient operation of the line input wells are made between companies. Arrangements are in effect whereby the companies alternate in operating the meters and controlling the gas injection during certain periods of time.

Core Data

As already mentioned, core-analysis data of the Glenn sand within the pool are by no means uniform, and the following discussion presents only more or less of a mean of the values found in the cores. In North Extension about five wells have been drilled in recent years to obtain core data. In general, the sand contains numerous shale breaks and laminations, and the clean sand footage, average permeability, and per cent oil saturation are less than at "Glenn Pool." To the present time no secondary-recovery projects have been started in "North Extension," although there is one operation located approximately on the border with the "Glenn Pool" territory.

In the "Glenn Pool" or 17n-12e area, the effective productive thickness generally is greater and of much better quality. About 49 core analyses have been made in this area during the past 2 years. One group of 23 wells which was cored had the following average data:

Saturated sand, ft.	137
Permeability, md.	102
Porosity, per cent	20
Over-all oil saturation, per cent	*28.5
Total oil content, bbl./acre	60,691

*443 bbl./acre-ft.

Within parts of Sections 8, 9, 16 and 17 a series of tests have shown that the Glenn sand section, while including a total of 125 to 175 ft. from top to base, more specifically consists of three separate oil-producing zones. Each pay zone is separated by more or less impermeable siltstone breaks. In some localities the siltstone breaks between the pay zones become more permeable, and the breaks and pay zones partially merge together.

Neither the thickness nor character of the three pay zones in the present repressure area is very uniform from even lease to lease. However, within certain portions of Section 8, 9, 16 and 17 the following data are illustrative of the general type of conditions:

	Ave. for portions of two projects	Ave. for one 160-ac. proj.	Ave. for one 160-ac. proj.
Upper pay—			
Thickness, ft.	41.2	22	32.2
Ave. perm., md.	125	163	130
Ave. poros., %	15.7	19.2	16.8
Ave. oil sat., %*	18.5	31.9	31.6
Ave. total water, %†	65.5	47.8	49.3
Main pay—			
Thickness, ft.	46.8	47	52
Ave. perm., md.	177	142	132
Ave. poros. %	16.5	18.2	17.5
Ave. oil sat., %*	49.0	33.9	30.4
Ave. total water, %†	44.2	58.6	52.0
Lower pay—			
Thickness, ft.	37.5	27	31
Ave. perm., md.	50	36	42
Ave. poros., %	14.9	15.3	16.9
Ave. oil sat., %*	19.2	20.0	9.6
Ave. total water, %†	61.8	62.5	71.2

*Based on representative porosity measurements.

†Corrected for 100 bbl./acre-ft. water of crystallization.

Studies have been made, and are being continued for the purpose of determining if the oil-content values from the cores are representative of conditions in place.

The filtrate-loss coring mud has not prevented substantial ingress of water filtrate into the cores. All of the water values are much higher than is believed to be the true condition. In contrast to the former use of the bentonitic coring mud, which resulted in very low chloride contents in the

(Continued on Page 65)

Faith in the Future

What's Behind the Trade Mark?

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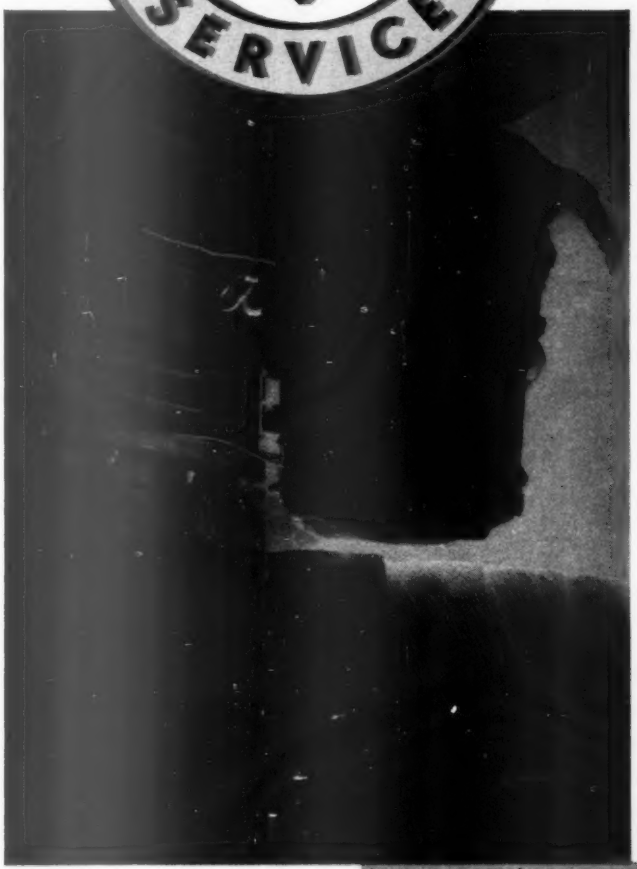


The Youngstown Sheet and Tube Company was founded in November, 1900 by 47 local investors, with an authorized capitalization of $600,000. In December, 1901, this capitalization had been increased to $4,000,000 to provide for the expanded program decided upon by the men of vision who planned the future of this company.

In February, 1902, 14 months after the initial meeting of the shareholders of this company, the first product carrying the Youngstown trademark was produced. In this same year, these pioneers took the first step to assure complete integration . . . the first producing blast furnace was purchased... the first ore properties were acquired... and the first coal lands obtained. These early acquisitions all served as a nucleus around which was created the great industrial organization, which in later years served mankind in every corner of the globe where products of civilization were making life more complete.

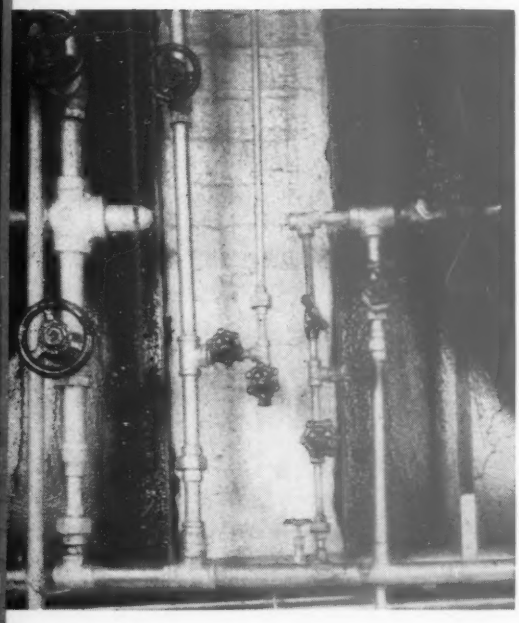
We are doubly appreciative of the efforts of those who preceded us at Youngstown. These men of faith, courage, foresight and action have bequeathed to us those things with which we can make a definite contribution in helping to win freedom for the world today, and upon which we can help build an assured prosperity for the future.

Pipe and Tubular Products - Sheets
Plates - Conduit - Bars - Tin Plate
Rods - Wire - Nails - Tie Plates and
Spikes - Alloy and Yoloy Steels

The YOUNGSTOWN SHEET AND TUBE COMPANY, Youngstown, Ohio
Manufacturers of
CARBON · ALLOY AND YOLOY STEELS

Continuous Blowdown in Gasoline Plant Boilers Reduces Scale Formation

by Neil Williams



THE boiler battery at Skelly Oil Co.'s gasoline plant No. 1 in the Burbank field, Osage County, Oklahoma, has been equipped with a continuous blowdown system that is proving highly effective in eliminating scale-forming accumulations. Through this, operating efficiency of the boilers is being greatly increased, and shutdowns for cleaning out are required with much less frequency. At the same time, savings are resulting from reduced feed-water treating requirements.

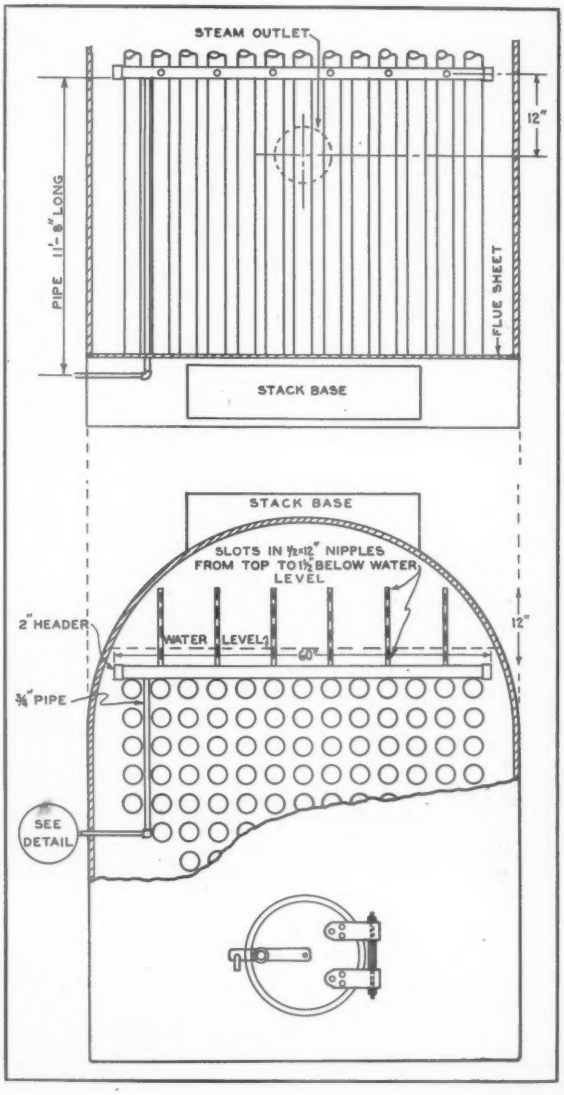
In the battery are three 150-hp. fire-tube boilers which are being run about 112 to 115 per cent of their rated horsepower capacity. Prior to the installation of the continuous blowdown, it usually was necessary to shut down the boilers at least once every 30 days for cleaning. On the 30-day clean-out schedule, from 300 to 500 lb. of scale deposit would be removed from a boiler each time. During operation, the boilers were blown down intermittently.

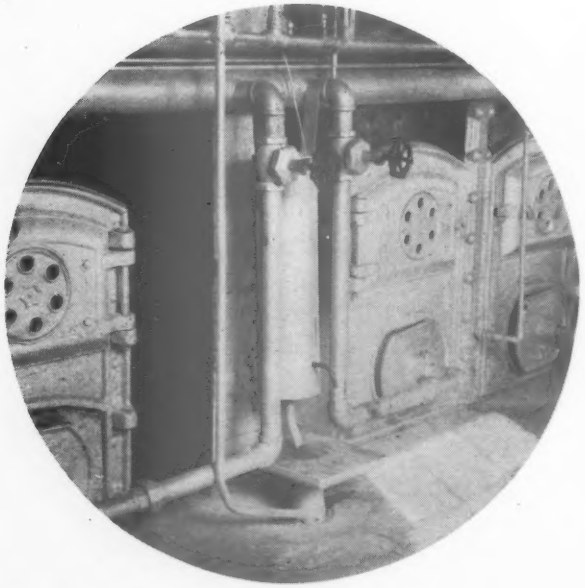
Since the continuous blowdown has been installed the boilers have been run at least 90 days before being shut down for cleaning, and in each case the amount of scale formed has been less than 10 lb. per boiler. Economies

Fig. 1 (left)—Down-line hookup of continuous blowdown on outside front face of boiler showing arrangement for taking samples.

Fig. 2 (below)—Sample condenser located below down-line hookup (Fig. 1). For detail of Figs. 1 and 2 see Fig. 4

Fig. 3 (right)—Skimmer installation inside boiler, showing plan view (top) and front elevation view (below)





IN A *Pacific*

AND CUT "*DOWN-TIME*" IN HALF

A check-up of lost-time pumping reports usually reveals the fact that from 60 to 75 per cent of the time lost is due to underground pumping equipment. And when a well is idle because it needs repair, a certain amount of deferred production may be lost through off-set drainage or water entrapment. It's then, production records suffer.

Design, workmanship, material and inspection of Pacific Pumps make for high volumetric pump efficiency. Pacific Pump installation results in: less maintenance and repair, less production lost through down-time, less power and fuel costs, lower treating costs, because less emulsion will be formed, and *greater ultimate recoveries.*

Check *your* down-time records—and you'll run in the right type *engineered* Pacific Pump!

PACIFIC PUMP WORKS

EXECUTIVE OFFICES & PLANT: HUNTINGTON PARK, CALIF.
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AFFILIATED COMPANIES: DRESSER MFG. CO., BRADFORD, PA., CLARK BROS CO., INC., OLEAN, N. Y.; BRYANT HEATER CO., CLEVELAND, O.

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are being effected not only by the fewer number of shutdowns and cleaning-out jobs, but also by the reduced time and cost of cleaning a boiler due to the smaller volume of scale to be removed.

Also, the smaller amount of scale accumulations lessens general maintenance and replacement requirements, and prolongs the operating life of the equipment. At the same time, more efficient operation is obtained through more effective steam generation occasioned by the absence of scale and improved water.

Reduction in scale accumulation has been made possible with the use of about 50 per cent less chemical in the feed water. Disodium phosphate is the

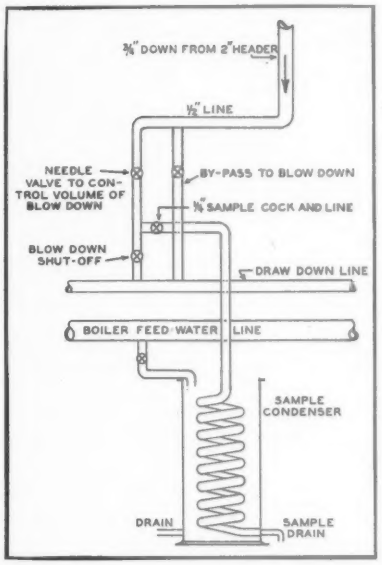

Fig. 4—Down lines and sample condenser hookup of continuous blowdown on outside front face of boiler

chemical used. Formerly, approximately 10 lb. was injected per day. This amount has been cut to about 5 lb.

Skimmer Installation Inside Boiler

The continuous blowdown, shown in accompanying drawings and pictures, was developed by operators at the plant. It provides for the skimming of the scale-forming scum as it gathers on the surface of the water inside the boiler and draining it through a small outlet line to a disposal sump. The skimmer (Fig. 3) consists of a 2-in. header, about 60 in. long, having a row of six equally spaced ½ by 12-in. nipples as risers along one side. This is placed horizontally on top and across the width of the tube bank at a position about 12 in. back of the steam outlet point or dome of the boiler. It is at that point, it is believed, that the greatest concentration of solids occurs.

Extending above the water level in the boiler, the riser nipples are slotted lengthwise from a point near the top to a point about 1½ in. below the normal water level. The slots allow for fluctuations in the water level and through them the scum on the surface of the water is skimmed off into the 2-in. header. The header has a ¾-in. outlet line leading to the front and outside the boiler. On the outside, this is swaged to a ½-in. line (Fig. 1 and 4) which in turn discharges into a 1-in. blowdown line serving the boiler battery.

A needle valve is placed in the ½-in. drain line from each boiler to control the volume of blowdown from the boiler. The volume usually is determined by the rate of accumulation of scum of scale-forming deposits on the surface of the water in the boiler. Provision is made for taking samples of the blowdown stream so that analyses of the boiler water can be made at any time. Frequent tests are made to insure adequate treatment of the boiler feed water and regulation of the rate of blowdown.

Method of Taking Samples

The method of taking samples is shown in Fig. 4. The ½-in. down line from each boiler has a ¼-in. bypass, fitted with a ¼-in. cock, through which a small stream can be diverted to a condensing coil located just below at the front of the boiler. The coil is in a shell (Fig. 2), fabricated from a short section of pipe, sealed at the bottom and open at the top and for cooling is submerged in water fed by a small line from the boiler feedwater line. The bottom end of the coil, with outlet on the outside of the water chamber, empties into any suitable container. The water chamber empties through a bottom outlet into an underlying floor drain.

Water and blowdown samples are taken regularly from three different places at each boiler; namely, the continuous blowdown stream, the bottom blowdown line, and the water column. A sample condenser, similar in design to the continuous blowdown sample condenser above described, but portable, has been provided for taking the bottom blowdown and water column samples. Until lately it has been the practice to take samples at each point every 24 hours, but the results of the continuous blowdown have been so favorable, it now is not considered necessary to take samples so frequently except of the continuous blowdown. A small laboratory has been provided to permit testing the samples at the plant.

Each of the boilers is blown down through the bottom blowdown for a few seconds every 24 hours to clean out valves and lines, but this is not to be compared with the more frequent blowdowns for longer periods necessary prior to the installation of the continuous blowdown.

Manila Rope Substitute Suggested

TO try to help industrial and civilian users of the smaller sizes of manila rope who have no rope on hand or who are using rope which is unsafe because of wear, the Chain Institute, Inc., of Chicago, Ill., has just completed studying the proper substitution of weldless chains for manila ropes.

The Army, Navy and Maritime Commission's urgent need for manila rope was brought into sharp focus recently by an appeal from the War Production Board for all manila rope that can be spared "if it is $\frac{5}{16}$ in. or more in diameter and 200 ft. or more in length." The Government offered to pay 10 per cent above the owner's net cost, exclusive of freight charges.

The study made by the Chain Institute revealed that although capacity for the manufacture of welded chain is being taxed to the utmost to fill essential war demands, there does exist idle capacity for making weldless chain. This capacity, which under normal conditions meets civilian chain needs, has been partially idle for more than a year because steel was not available for weldless chain production.

Tests on Weldless Chain

The institute then studied the breaking tests of weldless chains in comparison with manila rope, and prepared a table which brackets 10 ropes under 1 in. in diameter with the weldless chain that provides comparable strength for each.

For example: The smallest rope listed is $\frac{5}{16}$-in. Manila rope in this size made to Federal Specification TR-601a has a breaking test of 420 lb. and wartime substitute fiber rope a breaking test of 336 lb. The comparable weldless chains are Tenso type (No. 3) with breaking test of 375 lb., Lock-Link type (No. 4) with a test of 405 lb., and Niagara type (No. 4) with a test of 420 lb.

Similar convenient comparisons have been worked out for rope sizes ¼, $\frac{5}{16}$, ⅜, $\frac{7}{16}$, 15/32, ½, $\frac{9}{16}$, ⅝, and ¾-in. Copies of the chart are now available from chain manufacturers and hardware wholesalers.

The institute also reports that fittings and attachments already developed and available for service with weldless chain make possible its adaptation to many uses previously handled by manila rope.

According to the Chain Institute, tremendous war-use demand for welded chain prevents additional manufacture of this type of chain to replace the larger sizes of manila rope. Welded chain is vital for a thousand and one uses by the Army, Navy and Maritime Commission, as well as in industry, and there is no idle manufacturing capacity.

To non-licensees

Unless your refinery is now going the limit in making war products, here is a suggestion:

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Uncle Sam wants more refiners to produce more 100-octane gasoline by converting existing units, not by building new plants

Universal refining specialists can help you They will show you which of your units can be changed over—and how to do it Then it's up to you

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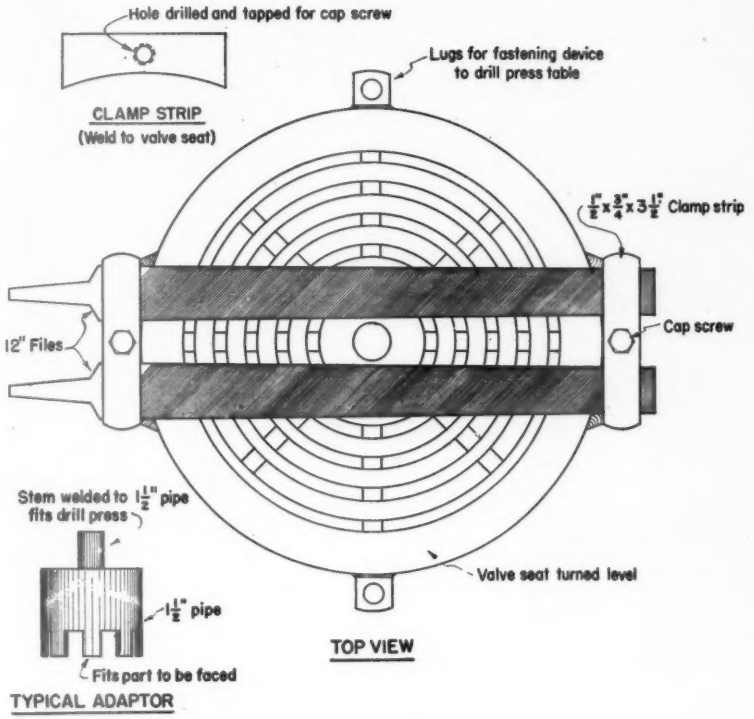
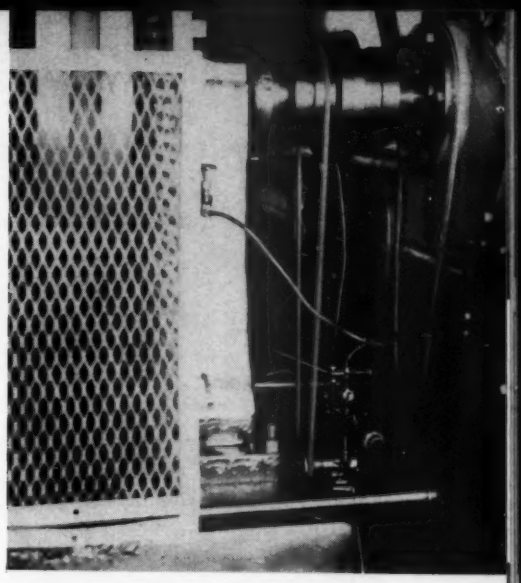

Hole drilled and tapped for cap screw
Lugs for fastening device to drill press table
CLAMP STRIP
(Weld to valve seat)
1/2" x 3/4" x 3 1/2" Clamp strip
12" Files
Cap screw
Stem welded to 1 1/2" pipe fits drill press
Valve seat turned level
1 1/2" pipe
TOP VIEW
Fits part to be faced
TYPICAL ADAPTOR

Novel Jig Devised for Valve Refacing

FINDING wide application in several gasoline plants is a specially constructed jig for valve refacing. The device consists of two mill files clamped to two steel bars approximately 1 in. square and 4 in. long, brazed to the opposite sides of a low-stage compressor valve seat which has been faced off smooth. A spider or "crow's foot" was made for each different seat and held in the chuck of a drill press or portable electric drill in the valve resurfacing operation. (Suggested by J. W. Sublette, Sasakwa, Okla., gasoline plant, Cities Service Oil Co.)

Portable Grinder for Furnace Bend Saves Machining

GRINDING rather than machining furnace bends has been found to save much time and money in a Panhandle gasoline plant. The bend, set on a jig, is ground with a portable electric grinder, care being taken that both ends are ground evenly. After grinding, the bend is spot-welded to the tube and the final process is the complete welding together of bend and tube. In this plant, removing and repairing tubes and bends is an almost daily occurrence and when it was necessary to machine the bends, a 60-mile trip to a machine shop was involved. (Suggested by A. L. Villines, Phillips Petroleum Co.)

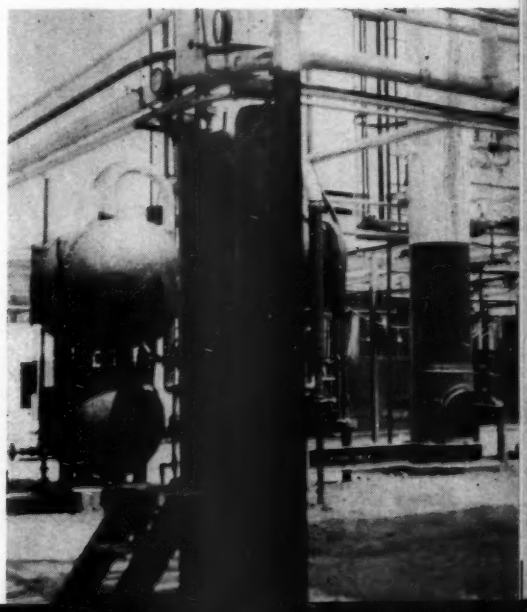


Oil Pump Drive From Engine Shaft Coupling

TO provide additional circulation of lubricating oil for an engine when needed, the operator in this refinery has installed a small auxiliary rotary pump directly below the flexible coupling between the engine and the hot-oil pump which it drives. The drive for the rotary pump is taken off the hub of the coupling by using a flat narrow belt. The piping of such an installation can be arranged to suit the individual requirements of the machine to be lubricated.

Outside Mounting for Ammonia Cylinders

BY pouring a small footing between the stanchions of overhead lines, the operator in this refinery has provided a convenient mounting for anhydrous ammonia cylinders, thereby removing them from a more or less tightly closed building so that any escaping chemical will be dissipated readily in the atmosphere. The pressure gages and control fittings are placed above the manifold connections.



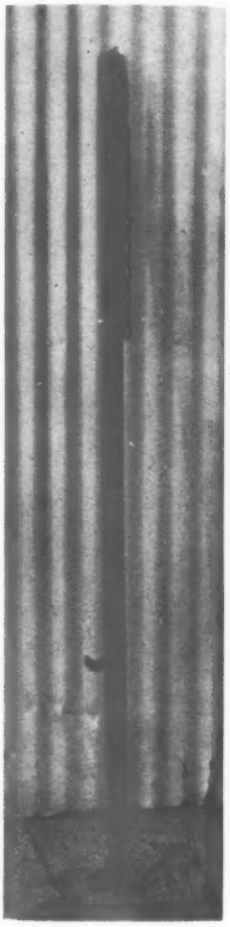
OPERATING IDEAS

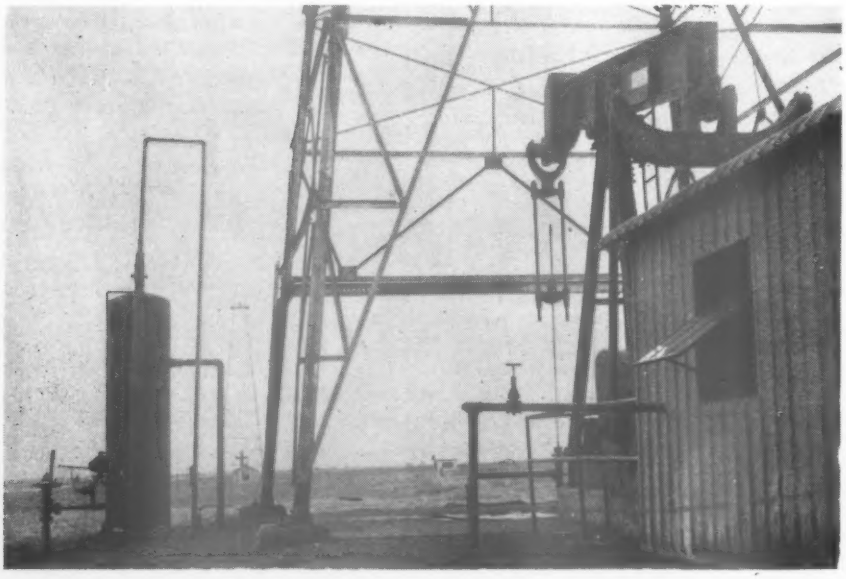
Housing for Outdoor Belt Drive

THE pump in this Kansas installation is driven by V-belt from a gas-fuel engine. Located outdoors, it was necessary to protect the belt both from the elements and from damage that might be caused by trucks or roaming livestock. The housing, fabricated in the operating company's shop from scrap plate steel, encloses the belt and drive sheaves on two sides and the top. The supporting frame is secured to the engine base and to the pump casing but is easily removable.

Jack for Making Pipe Connections

A HANDY, easily manipulated jack for holding up ends of pipe while making connection was made from an old piece of 2-in. pipe and a chain. A section about 5 ft. long was used. On one end was welded a circular flat plate to serve as a foot. A slot was cut lengthwise in the section from a point near the bottom to near the top. A small bracket for holding pipe being connected was shaped from a small piece of metal. This moves up and down through the slot. On the inside it is welded to a short piece of small-diameter pipe which moves on the inside of the 2-in. pipe and holds the bracket in position. The inside unit is raised or lowered by means of a chain which extends out the top of the 2-in. pipe. The bracket is held at any desired height by dropping the chain over a notch in the top of the pipe. It is in the form of an arc to prevent piping from rolling off while being fitted.





Individual Separator For Pumping-Engine Fuel Gas

EACH pumping well in this Kansas field is provided with an individual separator from which enough solution gas is trapped to supply the necessary fuel for operation of the engine pumping the well. The gas is taken directly off the overhead 4-in. vent line from the separator through a swage nipple to the 1½-in. line leading to the engine. A regulator valve inside the pump house controls the volume and pressure to the engine. Connection for the swage nipple and fuel line is made as a riser at the point where the vent line turns downward.

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USES This development provides a marked improvement in the analysis of charge stocks and feed streams used in the manufacture of synthetic rubber and high octane aviation gasoline, thus providing a superior means of control permitting more efficient plant operations. In *Research* it provides unlimited opportunities for investigation of problems arising in development of new products.

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Efficient Rate of Production

by H. H. Kaveler *

Oil reservoirs may be likened in some respects to engines. Both operate by transforming energy from one form to another and the performance of each is limited by certain basic designs or structural features. However, the analogy cannot be carried too far since there are many variable factors governing the behavior of reservoirs which makes a general or universal standard of efficiency impossible.

The "most efficient rate" of producing a reservoir can never be attained experimentally, since each can be produced only once and each differs from every other reservoir. There are certain basic fundamental principles, as outlined in this paper, which, when followed lead to increased efficiency.

This paper was presented, in slightly extended form, before the spring meeting of the Mid-Continent district, A.P.I. Division of Production, Tulsa, May 20-21, 1943.

THE application of scientific principles to a study of petroleum reservoir performance has brought an increasingly mechanistic attitude toward the fundamental actions that suggests a similarity between a producing reservoir and an engine. A producing reservoir and an engine are alike in the sense that both operate by transforming energy from one form into another, and both accomplish the energy transformation to a degree fixed by certain design and structural features as well as by speed of operation. Though analogies are often misleading, it is convenient to speak in such terms for the purpose of this discussion. Engines are constructed in the pattern of certain basic designs. A somewhat similar situation exists with respect to oil-productive reservoirs except that the designs are those created by nature. With respect to the first fundamental action operators have learned to distinguish between "solution-gas-drive" type reservoirs in which the principal energy source is compressed gas dissolved in oil, "free-gas-cap" type in which the principal energy source lies in the gas occupying a large gas-cap over the oil, and "water-drive" type reservoirs in which the principal energy source is a large volume of water in permeable contact with the oil-bearing horizon. Each type reservoir should, on theoretical grounds, and actually does in practice, exhibit characteristic behavior reflected by producing gas-oil and water-oil ratios, reservoir pressure decline per unit of fluid produced, and potential decline of producing wells as a function of the recovery obtained. The existence of these three fundamental types predicted by theory has by this time been amply demonstrated by field observation. The paper delivered by Buckley and Craze at the May 1943 meeting of the southwestern district of the A.P.I. presents in an excellent manner field data establishing the fact and the necessity for recognizing such types of reservoirs.[1]

Reservoir Characteristics

In addition to classifying reservoirs as to the type of drive by which energy is to be transformed into energy of flow, it is necessary to distinguish those characteristics of reservoir rock and its petroleum content which influence the efficiency of the energy conversion process involved in the second fundamental action. The solubility-shrinkage characteristics of the petroleum reservoir liquid, the viscosity of the reservoir oil, the oil, gas and water saturation respectively of the permeable reservoir rock, the effective permeability of the rock to oil and gas and water respectively, the permeability profile and the continuity of permeability, the thickness of the oil-bearing section, and dip of the horizon are all design features of the machine created by nature that must influence efficiency of operation. As is the case with any actual machine, there is an upper limit of efficiency beyond which an otherwise ideal production operation cannot be carried. One cannot hope, therefore, to recover all of the crude oil in a reservoir nor can one expect to obtain in actual practice complete conversion of reservoir energy into energy of production. No engine is perfect. Such remarks may appear to be somewhat trivial but they are made for the express purpose of emphasizing that it is almost as easy to adopt an arbitrary view on the standards of efficient operation as it is to utterly disregard the fundamental facts about reservoir behavior and produce petroleum in a wasteful manner. There can be no universal or general standard of efficiency in petroleum production. The industry cannot expect to discover universal permissible gas-oil ratio rules or similar fixed standards of performance as a basis for determining degree of efficiency. For the present, at least, each pool must be considered with respect to the type of energy source available to production and to the characteristics of the reservoir and its contents which determine in a large measure how efficiently that energy may be utilized. What program must be followed in each pool to increase efficiency in operation must then be judged in a competent manner and in the light of reasonable consideration by engineering analysis. Somewhere between wide-open flow and no production at all from wells drilled, both situations being wasteful, there must be a rate of withdrawal which is an efficient rate consistent with reasonable demand for petroleum from the pool.

Withdrawal Rates

The criteria for judging the rate of withdrawal that would lead to efficiency are simple enough. Withdrawal from a pool should be adjusted to a rate that will conserve reservoir energy. This may be stated in alternate ways. It may be said withdrawal should be adjusted to a rate that will maintain the producing gas-oil and water-oil ratios at a minimum. An equivalent statement would be that rate should be adjusted so as to minimize the reservoir pressure decline per unit of petroleum produced. In applying reservoir pressure decline as a measure of conservation of reservoir energy, it is of course necessary to recognize the limiting performance of the three possible types of drives.[1]

Maintenance of reservoir pressure is not the sole measure of successful reservoir control. The rate that conserves reservoir energy must be subject to further adjustment to a lower rate so as to maintain in so far as possible the normal gravitational segregation of free gas, oil, and water throughout the reservoir. The second and necessary criterion of efficient rate of production is whether or not the rate maintained is such as to maintain a uniform encroachment into the oil-bearing section of either water or gas, whichever is being relied upon as the energy source. Irregular encroachment of water or gas into a reservoir may isolate productive sections, or productive areas, in a manner so as to render otherwise recoverable oil nonrecoverable. Pre-

*Technical advisor, Phillips Petroleum Co., Bartlesville, Okla.

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OIL & GAS JOURNAL EDITION

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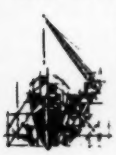
But there's another, a lesser-talked-about side to this war production picture that we at Baash-Ross think is mighty important. Instead of stressing the contributions industry has made to the war effort, we think even more important are the developments the war effort has made possible in American industry . . . *developments that have bridged in a few months what would normally have taken many years to cover..*

FOR EXAMPLE, this ship you see going down the ways. At the beginning of the war it took 5 to 6 months to build and outfit a ship like this. Today the same job is being done in a *small fraction* of that time. It's the *same* ship, built of the *same* materials, using the *same* fittings. But there is a tremendous difference in the "know how" of the men behind the ship. All along the line — the men who make the fittings, men who make the engines and equipment, and the men who put the ship together — have *all* learned vital speed-up techniques that have cut great slices of time from production operations.



Here at Baash-Ross we are machining a certain large part for this ship that is similar to an oil tool we've been making for years. We thought we knew all the tricks there were in this particular machining operation. But we're frank to state that we have learned more about this machine job in the past few months than we had learned in years before . . . because the pooling of trained minds from MANY *branches of industry has developed a better way of doing the job than any* ONE *group of engineers could alone. As a result, when the war is over, we'll be able to machine this oil tool faster and build it even better than we did before the war, bringing important benefits to you who use it!*

Every ship that goes down the ways . . . every plane that takes to the air . . . every item of war equipment that goes out to the war front leaves behind it a vast fund of newly-discovered improvements, of better techniques for doing the job. And this newly-gained knowledge means a great future for post-war production efficiencies.

mature encroachment of water or gas into a well increases operating costs and the economy of operation and also leads to excessive producing gas-oil and water-oil ratios with consequent excessive loss of reservoir energy.

How critical the rate of production factor may be in conserving reservoir energy through conservation of reservoir pressure and in maintaining uniform encroachment of the energy-bearing fluids available to production is a question left for the most part to further study based upon further field tests considered with respect to all of the factors that contribute to efficiency in performance. The theory of reservoir performance is adequate and points clearly to the fact that rate of withdrawal will have a significant influence on the efficiency of operation of most petroleum reservoirs provided reservoirs are developed in a manner to make rate adjustments an economically possible consideration. The practical man must take theory with the usual grain of salt. His faith in the practical value of the conclusions drawn from the theory of reservoir performance developed over the past 10 years should be greatly strengthened, however, from the results obtained in proper reservoir control by those who have employed the newer engineering principles. Operators who have taken the time and who have been willing to make the required dollar investment to obtain complete engineering data during the course of developing pools have discovered values by achieving new efficiencies in crude-oil production.

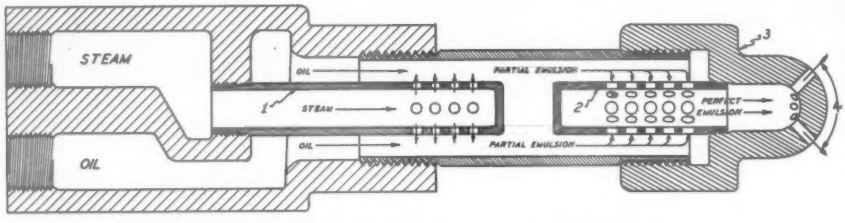
Rate of Production

The importance of rate to efficient operation has been shown from the practical operating viewpoint most convincingly in pools that have an exceptionally active and effective water-drive type of mechanism. The reasons for this are that an active water drive if it is present can be readily determined by the simple use of subsurface pressure gages to obtain reservoir pressure surveys early in the life of the pool, and the response of a water-drive reservoir to adjustment in rate of withdrawal is relatively rapid and quite apparent. Control of reservoir-pressure decline through adjustment of rate has been accomplished in a number of major pools, particularly East Texas, Yates pool, and in the Gulf Coast, and, in some instances, rates have been further adjusted for the purpose of maintaining a uniform encroachment of water.

Examples of where adjustment of rates was responsible for improved performance in gas-drive types of reservoirs are not as numerous. Yet, reservoir-performance theory indicates that a gas-drive reservoir, particularly under a gas-cap drive, under proper control should in most instances respond to adjustment of rate under favorable conditions with equal degree of improvement as do water-drive pools. There are several good reasons why good examples of the improved efficiency of gas-drive pools in response to rate adjustments do not exist. The gas-drive mechanism is not as sensitive to rate adjustment by its very nature, nor is it as efficient as water-drive operation. Results obtained in rate adjustment are therefore not usually immediate in gas-drive pools. Furthermore, the results to be obtained in the adjustment of the rate of withdrawal from gas-drive pools must also depend in a very large measure upon the location of the wells drilled in the field and upon restriction of gas production from individual wells, particularly those wells located in the structurally high position which by virtue of that high position may have excessive producing ratios. It would appear, therefore, that before rate adjustment would be effective in gas-drive-type pools, steps would have to be taken at the same time to restrict individual wells that produce excessive volumes of gas.

If the daily withdrawal from a reservoir is to be maintained within limits of efficient production fixed by the character of the reservoir and by the nature of its energy source, one necessity immediately suggests itself. Pools must be developed, investments must be made and operating practices must be such as to permit first a de-

BURNS OIL with a



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termination of efficient rate, and secondly, some freedom in choice of rate. In too many instances, pools are being developed without regard to engineering consideration of the reservoir. When this is done situations are created whereby investment in wells and other facilities require rates of production, to return reasonable profit on investment, that may be higher than conservative rates of withdrawal. When open-flow potential is no longer a measure of the worth of a pool, nor a measure of the amount of oil that may be recovered, and, when unnecessary waste of reservoir energy through excessive producing gas-oil or water-oil ratios is no longer a privilege of lease ownership, it will become increasingly important for operators to determine first the type of drive that apparently exists, and, from that the number and location of wells to be drilled through a careful determination and study of the characteristic reservoir properties. When that sound engineering procedure is adopted, investment can be adjusted and made dependent upon efficient rate. Otherwise, wells are likely to be drilled in wasteful numbers or be located in a manner as to use reservoir energy inefficiently, and rate of withdrawal as a factor in conservation becomes a precluded consideration. If one could divine the future, many pools would be developed quite differently. But since the future cannot be known, the prudent operator will realize the advantages to be gained from sound engineering analysis and will not rely upon the mere drilling of wells in great numbers in the belief that numbers of wells alone will assure maximum benefits from the discovery of any producing horizon.

The principles of reservoir engineering developed in the past 10 years have established one fact perhaps more important than all others. A well can be properly regarded now only as one element in the production machine, and, it can function efficiently only when it is by design drilled, completed, and operated in a manner that uses reservoir energy of production effectively. It is more important, therefore, to drill wells at strategic locations with respect to structure and type of reservoir drive than it is to follow a geographical pattern fixed by ownership on the surface. Wells must be drilled to explore structures, establish the reservoir characteristics necessary for a proper analysis of the future reservoir performance and only in such manner as to insure an efficient rate of withdrawal consistent with the demand for crude-oil production. Efficient development is the forerunner of efficient rate of withdrawal. It is, in fact, quite common in recent years to come to the conclusion that the interest of everyone in a reservoir can be served best by substituting for wells drilled an investment in one type of secondary recovery or another. The success of the number of gas-injection projects instituted early in the life of many petroleum reservoirs as well as other secondary projects should be ample evidence that proper engineering analysis of reservoir conditions generally points to considerations more important than the mere drilling of wells.

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Conservative Operation

The technical literature developed in the past 10 years is evidence of the growing appreciation of the importance of adjusting investment and operating practices so that every operator may enjoy the advantages of exploiting pools in a conservative manner rather than by individual wells in a wasteful manner. A no more convenient nor instructive compilation of the principles of the new oil production technology exists than that presented by the report of the Special Study Committee on Well Spacing and Allocation of Production of the American Petroleum Institute.[2] That report, available in booklet form, deserves the serious study of everyone interested in conservation oil production practices.

Controlled rate of withdrawal not only provided the fundamental principle upon which the system of proration was brought into existence, but controlled rate of withdrawal has de-

(Continued on Page 78)

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Buy War Bonds. Conserve Rubber. Eliminate Unnecessary Travel. Use the Telephone Only When Important. Salvage All Scrap and Waste Material.

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Whether it be in the armed forces or on the production lines, it takes patience, endurance and determination to do the job that needs to be done.

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Front Lines in

REFINING

by Arch L. Foster

On this page we shall turn the spotlight of careful observation on the currently important trends, technical discoveries and advances, prospects and problems of the refining industry and summarize as far as possible their meanings, import and effects.

Watchman—What of the Natural-Gasoline Industry?

BECAUSE of differences in vapor pressures, in volatility, the natural-gasoline industry came into being—originally a nuisance industry, getting rid of a material then undesirable in the places where it showed its face, condensate in lines where no condensate should be; slugging out in gouts of liquid at undesirable places to confuse and complicate the operator.

The petroleum and gas industries realized shortly that this nuisance material, 'wild' as it was, had a very definite place in the fuel and other industries. From a nuisance value natural gasoline gradually became a product having premium properties. Note that I say 'premium properties'; premium value has not always been recognized, and premium prices seldom if ever realized.

With the progress in hydrocarbon technology, in the synthetic chemistry of hydrocarbons and of commercial products which may be derived therefrom, with the terrific impetus given by the war's exigencies to industry of every sort, the executives, chemists, technologists and financiers of the natural-gasoline industry are asking with increased emphasis nowadays the question of what rehabilitation shall be given its technology and its economics—and its customers are asking the same things.

Time was when natural gasoline served its single main purpose admirably, and it still serves that purpose well. Involvements, competition of products from the chemist's and the engineer's efforts are complicating the field for the natural-gasoline producer, once so relatively simple. Science and technology are the dual benevolent infections which have enveloped all industry so rapidly that the situation is no longer a question of "Shall we use these new processes?" but "How shall they be used?"

One of the major problems is that of correlation of economics with science and technology. And there we run into one of the most common of human frailties—distrust of the things we do not understand. The nontechnical executive, the operator who is long on rule-of-thumb, practical experience, but shorter on this thing called science, is naturally a "Doubting Thomas."

In so far as the above statements reflect facts, neither group is either correct or consistent. The oil and gas industries are built on the uncertainties which make possibilities interesting—a gamble. The margin of profit is generally measured by the degree of chance taking; conversely, greater possibility of large profits induces and excuses larger chance taking. General opinion now is that the proper technical development of natural-gasoline materials as intermediates for manufactured products is the most dependable insurance for a prosperous future, in the long run.

"Cat" Cracking in a Barn

THE initial reaction of an intelligent technologist who has not been in close touch with the rapid advances in catalytic cracking is and has been in frequent instances, "But why such huge equipment?" Result of that query is the thought that, as this highly important field is expanded, shall we find ourselves progressing in the direction of smaller equipment, less involved procedures, less expensive operations? Some of our best "cat" units now occupy as much space as a huge metropolitan skyscraper, and cost more. The operation of only a single such unit certainly partakes of the caliber of "big business," no game for the small refiner.

It has been the history of every important and most unimportant processes that as more is learned of each, as development expenses are paid by returns, the processes are adjusted to small-scale operations. This is especially true of thermal cracking, of catalytic polymerization, of field repressuring, of natural-gasoline recovery. Unit costs similarly will come down. Time was in the late twenties and early thirties that thermal cracking unit costs ranged $1,000 to $1,500 per barrel of gasoline produced per day; in more recent years this value fell to less than half that figure. The same may be expected, qualitatively at least, with catalytic cracking processes, as to cost as well as physical size.

Helicopter and "Reg'lar" Planes

HELICOPTER airships, those funny-looking planes with a horizontally disposed Dutch windmill atop which when operating turns lazily but makes the plane do amazing things, will be the complementary, auxiliary equipment for the airlines of the future, says none other than Dr. Igor I. Sikorsky, inventor and promoter of the windmill plane.

By the end of the war helicopters will be developed into practical, essentially foolproof family vehicles, and probably will be built for the cost of a medium-priced car, says Igor. If so, the helicopter principle will solve one of the major obstacles to adapting the plane to general use by the average person, that of setting it down safely.

Helicopter-equipped secondary airlines will serve as feeders for the main lines, of more or less transcontinental scope and length, the inventor says. They will in no wise compete with our conventional-type airliners, but will bring in passengers, freight, etc., from the smaller cities and towns to be picked up by mainline planes.

In such a role the helicopter, with its ability to rise from and land in small, inexpensive fields, will assume much the same function in air transportation as the small branch railroad feeder lines have served for American railways. It apparently can do several things more efficiently and economically than the regular type of plane can do. It appears that this plane will enable us to solve the problem of air service to the smaller, off-the-main-route towns and cities as a branch road plan has served the railroad system these many decades.

This means more outlet for, more consumption of aviation fuels and lubricants. Such a probability offers better prospects for utilization of the refining industry's war-expanded aviation fuel and lubricant capacity.

Gas Repressuring At Glenn Pool

(Continued from Page 48)

cores, the low filtrate loss mud, has resulted in the obtainment of chloride values which calculate to reasonable values of connate water by the method described by Barnes and Woods.[2] This might imply that coring with high filtrate mud results in the partial flushing of both connate water and the oil content of the cores, whereas with the low filtrate loss mud no connate water is flushed although possibly some oil content might be lost. The Glenn sand in one well was cored with oil, and the water-content value of one section was 12.4 per cent as against 17.0 per cent by calculation from the chloride determinations.

As to the oil-content data, some other pools in the Mid-Continent area where secondary-recovery investigation and development are being done on sands at depths of 1,000 ft. and greater, it has been found that the oil-saturation values often are considerably lower than those indicated by deducting past oil production from the effective pore volume. This most logically implies that part of the existing oil content in the sand has been flushed out during coring procedure. In several comparative cases the partial flushing of the oil content has appeared equally severe in both rotary and cable coring. At the present time it is not known whether severe flushing of the oil content has occurred in the Glenn Pool core tests. It is unfortunate that in most cases at Glenn Pool the past-production records are not complete so that the remaining oil can be determined by deducting past production from effectitve pore volume. Even if available, accurate reallocation would be difficult to the two or three more or less separate productive zones. However, with further new drilling and further studies, additional core analyses, electrical logs, and drill cuttings should provide a more complete, continuous, pool-wide description or picture of the entire reservoir.

Performance of Repressure Projects

As of April 1, 1943, there are 18 projects in operation. Tabulation of repressure data and production results is given in Table 1. The properties comprise 2,000 productive acres and before the new development work had 308 producing oil wells. To date 51 new oil wells and 65 input wells have been drilled. The oil production for March 1943 was 1,983 bbl./day in contrast to a prior average of 714 bbl./day, or an increase of 1,269 bbl./day. The current weighted average injection of air-gas is 1,600 cu. ft./bbl./day of increased oil production.

Before the repressuring the average oil production per well was 2.3 bbl./day while currently the rate is 5.5. Some of the new oil wells that have been completed nearby to input wells that had been in operation a few months have secured initial rates of oil production substantially above the current average rate for the original oil wells. Where such new oil wells have been drilled at inside locations or hitherto undrilled territory in central portions of the leases, the initial rates have been as high as 25 to 40 bbl./day. In some of the repressure projects where several new oil wells of such type were drilled about one-third of the increased oil production is obtained from the new oil wells and about two-thirds from the repressure effect on the original oil wells.

A curve of the oil production from the 18 projects since the L. R. Kiefer operation was commenced in May 1940 is given in Fig. 3. Previously the average production for the group had been 747 bbl./day. The average normal rate of decline for the properties had been 4 per cent per year. To April 1, 1943, the estimated accumulated increase in oil production has been 580,914 bbl.

It is estimated that approximately 1,800 tons of steel was used in the repressure work. The large majority of the tonnage was second-hand light weight casing and was not suitable for deeper wells. Based on current production an average of 1.42 tons of steel has been used per barrel of additional oil per day. As elsewhere discussed, the increased oil production rate should be well sustained and represent substantial reserves.

The former or normal gas production from the 18 projects had been 755,000 cu. ft./day, and additional withdrawals of 1,434,000 cu. ft./day now are being made. Total input is 1,994,000 cu. ft./day. The additional gas withdrawal currently is 72 per cent of input. Probably a lesser

TABLE I - GLENN POOL REPRESSURE DATA

Project Symbol	Months Since 1st Input	Size of Project, Acres	Aver. Oil Prod. Bbls. Per Day Before Repress.	March 1943	Increase	Aver. Input MCF/24 March, 1943	MCF/24 Injected Per B/D Oil Incr. March, 1943	Produced G/O Ratio Before Repress.	March 1943	Number of wells OIL Old	New	Total	INPUT		REMARKS
(1)	36	160	61	250	189	326	1.7	1100	1440	24	12	36	15	9	Project possibly complete.
(2)	31	160	46	319	273	280	0.9	1045	1035	24	9	33	10	71/2	Proj.poss. 90% complete.
(3)	34	160	36	97	61	80	1.3	1470	1062	18	4	22	4	2	" " 80% "
(4)	13	160	52	87	35	75	2.1	711	1172	21	6	27	1	3	" " 80% "
(5)	23	40	11	21	10	20	2.0	2730	3900	8	0	8	0	1/2	" " 20% "
(6)	23	40	14	24	10	20	2.0	1570	917	9	0	9	0	1/2	" " 20% "
(7)	33	80	22	48	26	90	3.5	3045*	3636*	16	1	17	0	2	" " 30% "
(8)	17	80	43	183	140	156	1.1	628	436	10	4	14	0	4 1/2	Project possibly complete.
(9)	16	20	16	41	25	42	1.7	938	804	4	4	4½	1	1 1/2	Project possibly complete.
(10)	11	160	109	337	228	213	0.9	686	548	27	3	30	9	8 1/4	Proj.poss.90% complete.
(11)	16	160	60	116	56	101	1.8	833	784	21	2	23	8	5	" " 75% "
(12)	2	40	20	39	19	42	2.2	800	616	9	1	10	1	2	" " 80% "
(13)	4	160	46	72	27	139	5.1	1390	2750	24	5	29	1	5	" " 80% "
(14)	4	80	52	59	7	55	7.9	692	830	13	0	13	0	2	" " 80% "
(15)	16	80	40	137	97	99	1.0	450	525	6	3½	9½	0	3 1/4	Project possibly complete.
(16)	21	120	35	45	20	75	3.8	3000*	2760*	26	0	26	0	2	Proj.poss. 80% complete.
(17)	48	160	25	38	13	175	13.5	1200	3025	15	0	15	0	5	Loc. in "No. Extension"
(18)	10	160	44	70	26	27	1.4	1886	1200	33	0	33	0	2	Proj.poss. 35% complete.
	TOTAL:	2,000	714	1,983	1,269	1,994	Av. 1.6w Av. 3.0a	Av. 1057w Av. 1225a	Av.1104w Av.1480a	308	51	359	46	65	

* Estimated w Weighted a Arithmetic

Pressure Vessels...

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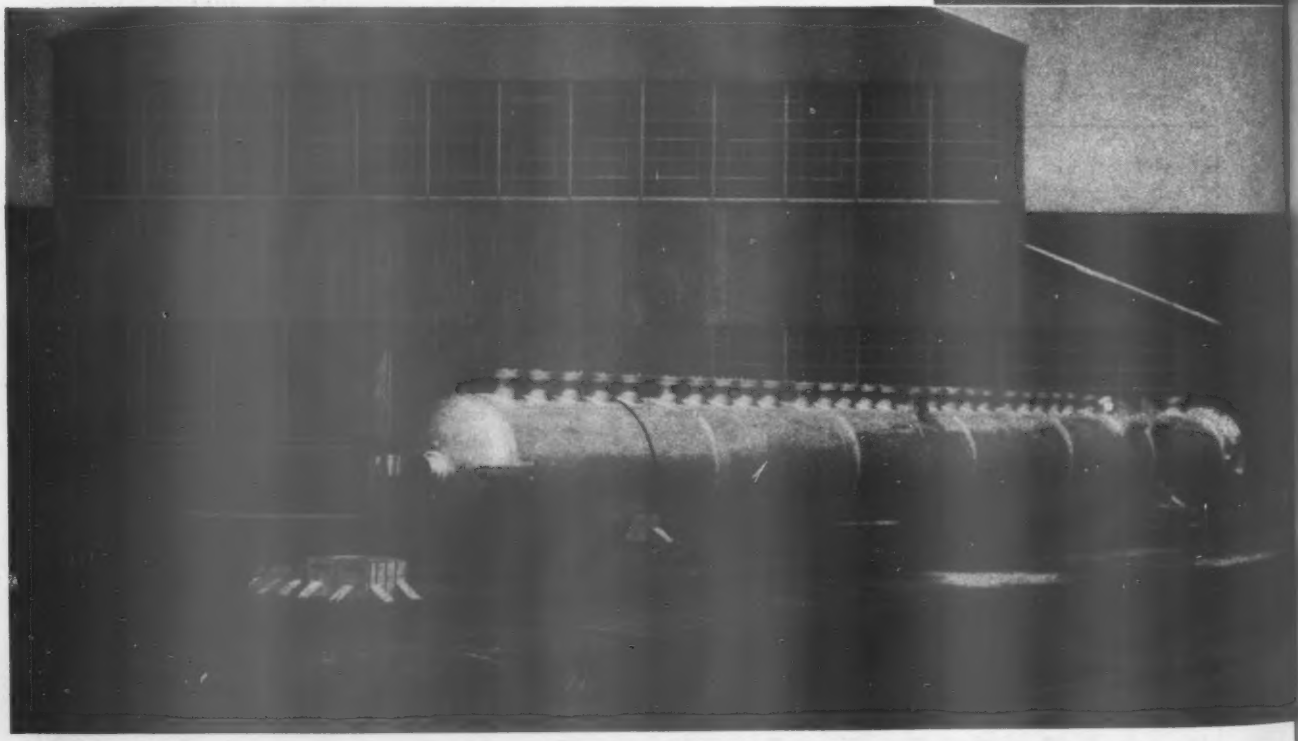
Above Right: 6 ft. diam. by 80 ft. stabilizer tower with special man holes. Extreme Right: This solution stripping tower measures 4½ ft. in diam. by 43 ft. 3½ in. Below: 6 ft. diam. by 80 ft. debutanizer tower. All vessels were fabricated and stress-relieved for an east coast oil refinery.



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amount of gas should be withdrawn if it were not necessary to have gas available for injection. Even with this withdrawal rate, however, wells which formerly had an average of 25 in. of vacuum at the casingheads now have pressures ranging from 15 in. of vacuum to atmospheric.

The gravity of the oil produced for various projects has increased from 1.5°. to nearly 3° since the repressuring.

Increased Recovery

An accurate method of estimating the increased oil recovery that may be obtained at Glenn Pool by repressuring has not yet been developed. In some work reliance has been made on comparisons with similar projects elsewhere, accounting for differences in past oil production, sand character, thickness, per cent oil and water saturation, and other pertinent factors. The most similar operations in the Mid-Continent probably are the pattern-type air-gas drives in the northern portion of the Nowata (Oklahoma) field and some comparisons with these have indicated that repressure yields for the better Glenn Pool properties may be between 5,000 and 10,000 bbl./acre.

Other investigators have examined recovery data for a large number of gas repressuring projects in the Mid-Continent which have had substantial operating history and found that on the average the successful operations will obtain about 25 per cent more oil than would have been recovered ultimately without repressuring. On this basis, with the average recovery expectancy at Glenn Pool without repressuring on the order of 28,000 bbl./acre, the repressuring might effect an additional yield of about 7,000 bbl./acre.

Neither of the above methods of recovery estimation are precise in character and depend specifically upon the exact sand conditions and the existing oil and water-saturation values under a particular lease, and are in the sense of broad experience factors. Possibly the best method that might be used should be based on the average percentage of oil and water saturation existing under a given lease. The recovery expectancy of the repressuring should be the difference between the existing per cent oil and water saturation at the start of the work and a lower per cent oil and water saturation that would be obtained when the produced gas-oil ratio reached a limiting economic point. Such a method, however, requires reliable relative permeability—saturation curves for the sand and oil and water-saturation core data which are representative of conditions in place in the formation.

Following the conception that recoveries by gas repressuring eventually will be confined to the point where an uneconomic produced gas-oil ratio is obtained, it is believed that the present gas-oil ratios of the projects as given in Table 2 are of interest. With only five exceptions the projects at the present time have produced gas-oil ratios less than 1,500. The current weighed average ratio is 1,450, while the average before repressuring was 1,225. As a matter of fact, it will be noted that the present produced gas-oil ratio of many of the projects is considerably lower than before repressuring started. Interesting speculations might be made as to the physical aspects of this circumstance. Detailed data for two projects for gas injection, oil and gas production, and the injected and produced gas-oil ratios are given in the accompanying table.

While only a short period of operating life has elapsed, apparently the increase in produced gas-oil ratio will be slow and a long period of operation, probably on the order of 10 to 20 years, should be in prospect for most of the projects before the produced gas-oil ratio reaches uneconomic proportions.

Acknowledgment is made to the following for assistance in assembling various data for this report: Messrs. J. L. Dimit, I. W. Fox, and J. D. Fisher of Gulf, R. M. Carr of Sinclair Prairie, A. M. Mouser of Tide Water, L. B. Jackson, Jr., and H. J. Whitehill.

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2. "Distinguishment Between Oil and Water Zones From the Connate Water-Oil Ratios Determined by Core Analysis," K. B Barnes and R. W. Woods, A.P.I. Prod. Bull 224, Vol. 20 (IV), 1939.

Year and month—	160-ac. Project—Started 10-31-41					160-ac. Project—Started 10-31-41				
	Oil, bbl./day	Gas M.c.f./day Injec.	Gas M.c.f./day Prod.	Gas-oil ratio Injec.	Gas-oil ratio Prod.	Oil, bbl./day	Gas M.c.f./day Injec.	Gas M.c.f./day Prod.	Gas-oil ratio Injec.	Gas-oil ratio Prod.
Ave. before repressuring	99	...	60	...	606	102	...	70	...	686
1942:										
January	162	90	93	554	574	122	6	68	49	657
February	174	148	111	850	637	128	6	74	47	578
March	203	204	127	1,005	626	127	19	78	150	614
April	244	224	152	918	623	126	18	81	143	642
May	304	222	169	730	556	121	62	87	512	719
June	344	240	175	698	508	127	128	98	1,007	771
July	367	250	175	681	476	163	183	100	1,122	613
August	390	248	200	636	513	197	295	124	1,040	629
September	413	283	199	686	482	250	247	150	988	600
October	398	304	199	764	500	270	249	158	921	583
November	382	307	191	803	500	306	238	167	778	546
December	384	272	194	708	505	322	236	179	733	556
1943:										
January	334	275	195	822	584	319	210	170	659	533
February	347	312	178	898	513	323	236	170	730	526
March	361	297	183	823	507	337	213	185	632	548

BOOK REVIEWS

Diesel and Gas Engine Power Plants. By Glenn C. Boyer. Published by McGraw-Hill Book Co., New York. 447 pp. $4.

This book is written primarily for the designer and operator of diesel and gas-engine power plants, although some of the material has been used in lectures before engineering students. It is entirely practical in treatment, and the material has been used for many years by the author in his professional work as a consulting engineer.

World Minerals and World Peace. By C. K. Leith, J. W. Furness and Cleona Lewis. Published by the Brookings Institution, 253 pp. $2.50.

This study shows how the rise in mineral production and consumption has paralleled the expansion of industry in the North Atlantic power belt. Both in volume and variety, the mineral requirements of industry have been increased with the progress of our machine age. The practical question is whether controls on the production and trade in minerals can be so devised and administered as to furnish an effective method of preventing future wars.

The Amazing Petroleum Industry. By V. A. Kalichevsky. Reinhold Publishing Corp., New York, N. Y. 234 pp., $2.25.

This book is an interesting and nontechnical resume of what petroleum is, what it does, how it is obtained and transported, how chemists have learned to extract from it gasolines of superperformance by the "cracking" process, and how essential by-products are derived. Written in language easily understandable by the layman, it briefly and clearly highlights the story of petroleum.

Problems in Connection With Protection of Bare Pipe

*by W. H. Stewart**

THE widespread utilization of cathodic protection to buried pipe lines in recent years has stimulated investigation into more and more possibilities of this method of pipe-line maintenance. From initial, scattered installations on coated lines to a more recent trend of continuous protection of long sections of line, is in brief, the history of this development.

The possibility of protecting bare pipe has been discussed pro and con since the inception of this corrosion-prevention method. It was believed by some engineers that electrically protecting bare pipe would be entirely impractical. Others, pursuing the idea into actual field tests, began to acquire data suggesting the possibility of this method not only being practical from an economical standpoint but also to be very effective in arresting corrosion.

Available Power

As in any continuous protection program, available power presents a serious problem. Since it is usually undesirable to transmit power in excess of 2,300 volts along and over existing telephone lines, extreme distances from a suitable source of power may make an installation of this sort prohibitive. In average populated areas, however, power is available at sufficiently frequent intervals to enable the engineer to accomplish his objective with transmission lines of only a very few miles in length.

Several methods of transmission of power along the right-of-way, varying from standard cross-arm construction down to single feeder with pipe-line return, are in use.

The writer has used the latter method in three recent installations ranging from ¾ to 3¾ miles in length. The line construction was simplified as much as possible. Alternate telephone poles were replaced with higher poles and copper-clad steel conductors pulled up and placed on pole top pins. A conductor with excessive mechanical strength is used since during stormy weather the line is exposed to trees and branches in wooded sections.

Where low voltage is available at the power source, I have utilized small standard transformers fed by 220 volts in reverse as an insulating and stepup transformer. This simplifies switch gear and enables field personnel to have control over the lines, replacing of fuses, etc., at a voltage they do not hesitate to handle.

Telephone Interference and Safety

The problem of telephone interference has been responsible for no end of grief in some cases, particularly where carrier circuits are used on physical lines. Fortunately, my experience so far has been confined to installations adjacent to common metallic circuits. Here the interference problem is fairly simple. A balanced-loop or closed circuit, consisting of 1 to 1 insulating transformers with matched two-winding secondaries, can be utilized to "bleed off" any unbalanced voltage condition, and at the same time create a bombproof safety measure with regard to the telephone line (Fig. 1). Any accidental contact between the power and telephone lines will result in the immediate grounding of the power line through the vacuum-type lightning arrestor, blowing the fuses and thus "killing" the power feeder. This feature has been put to test on numerous occasions and I find it works faultlessly.

The problem will differ to some extent with varying pipe size and soil conditions encountered. In field tests conducted on the Gulf Coast a few years ago on a 10-in. bare line, the following spacing and size units were decided upon: Unit spacing, 1,750 ft.; unit size, 8 volt, 24 amp.; ground bed (approx.) 100 ft. from line.

Both the distance from ground bed to line and unit spacing were determined from data gathered in tests for this purpose alone. In the particular installation that followed these tests, the distance between units could have been decreased to some extent. However, right-of-way difficulties favored the wider spacing and no great amount of excess current is lost as a result. Thirty-four rectifiers spaced approximately ⅛ mile apart make up this continuous line. An analysis of the power cost over a 12-month period reveals a cost of $0.013 per foot per year, or an average cost of $5.73 per month per mile. This power is purchased and metered on a regular utility commercial lighting rate. On the basis of these figures and knowledge of reconditioning costs, the initial installation cost of electrical protection, plus power cost, will take approximately 21 years to equal that of a complete reconditioning job.

Pipe-Soil Potentials and Current Density

It has been our policy to create a pipe-line potential of at least 0.3 volt in excess of the original potential existing before protection is installed. Any excess of that necessary for adequate protection, though wasted, is not as harmful in the case of bare pipe as it would be on a coated structure where excessive potentials would tend to damage the bond of the coating.

Along a bare line recently under investigation, the average current density, estimated from current gain along the line, varied from 1.5 ma. to over 5 ma., while the pipe-soil potentials were fairly constant along the same section at 1 V. (uncorrected with respect to $CuSo_4$+cell).

Since this section under observation has been protected some 3½ years and the leak record has become nonexistent, it would appear that in some cases at least, much less than the generally accepted 4 ma. per sq. ft. will furnish adequate protection.

Results

No great deal of empirical data is yet at hand for conclusions regarding this type of maintenance. However, from the few installations the writer has had the opportunity to observe, this method of pipe protection should merit further investigation. When compared to the cost involved in physically reconditioning a line that is in fairly good working condition, this method suggests possibilities that should be studied closely when the problem of overhauling a line is under consideration.

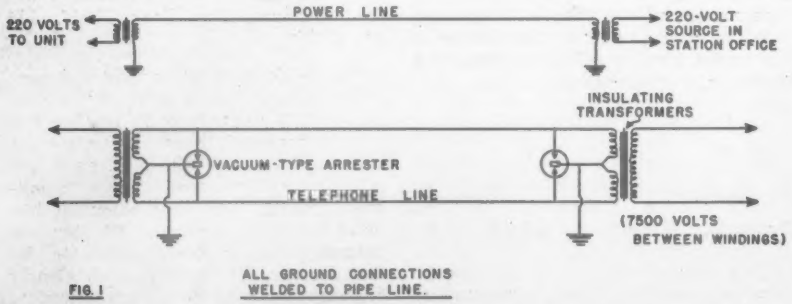

FIG. 1

*Sun Pipe Line Co., Beaumont, Tex.

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AIR CLEANER: *Change oil every 175 hours, using good clean light weight lubricating oil. IN SEVERE DUSTY CONDITIONS CHANGE DAILY.*

OIL FILTERS: *Change cartridge when oil begins to darken. Keep extra cartridges readily available.*

FAN PULLEY BEARING: *Lubricate with ball roll grease. Keep reservoir full. Check every 175 hours. DO NOT EXCEED RESERVOIR CAPACITY.*

THE BUDA COMPANY, Harvey (Chicago Suburb) Illinois

Joint Use of Production Facilities and Manpower

by H. M. Stalcup *

Cooperation in husbanding manpower is preferable to acting under compulsion. Ways in which operators can voluntarily take steps leading to more effective use of equipment and manpower are outlined in this article which was presented in slightly extended form before the Mid-Continent district, A.P.I. Division of Production, at its spring meeting in Tulsa, May 20-21, 1943.

THE varied ways in which a joint use of production facilities and a consequent husbanding of manpower can be effectuated are manifold, some of the more important ones being as follows:

1. Unitization of pools.—This plan requires unitization of working interests and royalty interests. It is most adaptable in new pools, in early stages of development. Legal complications, bickering over pool limits, participation interests, and points of management require a great deal of time to work out. As time is now essential, this plan can best be considered only before development or in the early stages of development of some particular pool.

2. Unitization of operations.—This plan considers only the unitization of the operations, with no change in the royalty ownership. It is an ecomony plan which eliminates duplication of facilities, manpower and management. It is being used in wildcat areas to a great extent during the present emergency. Acreage is pooled in a unit by companies in an area where development is desired. The participation interest of each company in the unit is determined by the amount of acreage contributed to the unit. This plan, as well as Plan 1, requires unitization before development or in the early stages of development. This plan has definite objections in so far as the unitization of producing properties is concerned:

(a) It is often difficult to form an agreement between operators in a proven pool covering participation interest.

(b) A reluctance on the part of operators to relinquish pet properties.

(c) Question of the type of management or producing practices of the operating company.

The above-listed plans have been available to the industry for a long time but have not been used as extensively as possible.

3. Consolidation of operations.—This plan considers the trading of oil properties between companies on some equitable basis, to the end that each company's holdings within a given area will be such that a wider distribution of manpower and facilities would result. This plan offers definite objections in the present emergency for the reason that most companies are not prone to accept the evaluations of other companies. Each company involved in a trade endeavors to seek an edge over the other. Working out these differences of opinion requires a great deal of time, which is essential to the plan. This is a meritorious plan, however.

4. Operating agreements (producing).—Under this plan, a great many one and two-well leases, separately owned, which are operated by full-time pumpers or switchers, could be operated by an operator on a contiguous tract who is not utilizing his pumpers or switchers at a maximum of their efficiency. This plan assumes that the pumper's time will be contracted for at a certain rate per well per month, depending upon the time required by a pumper to operate a certain well. Engine trouble, treating problems, etc., will affect the rate.

There are a number of instances where adjoining operators might supply power for jack pumping, and thus avoid installation of critical individual pumping units. Each case would have to be given individual study to determine the horsepower requirements of the jack well and availability of power at the key well .In areas where central pumping powers are suitable, the problem would likely be less difficult as usually a few extra wells can be hooked on without overloading. Such services is customarily furnished for from $25 to $50 per month, depending primarily on the horsepower supplied and the number of hours operated.

These plans generally assume that facilities and maintenance labor will be furnished by the owner. It is believed that this plan would have greater application if it were properly publicized and presented to the industry through various trade organizations. It has not been as widely publicized as other plans, and a great many small operators are not acquainted with its value. In addition, it is believed this plan has not been expanded to its maximum possibilities because of:

(a) Reluctance of some operators to contract their operations.

(b) Well-servicing problems.

(c) Maintenance labor.

5. Cooperatives.—Under this plan, the operations within a pool would be on the basis of Plan 2, Unitization of Operations, and have the same advantages except that the operations would be supervised by a committee composed of field superintendents who would plan and coordinate the work programs. The plan also considers the joint use of manpower, joint use of facilities, and the reclaiming of surplus or unnecessary facilities and materials.

6. Cooperative use of well-servicing equipment.—The cooperative utilization of various operator-owned servicing units within a given field or compact area may be practical in some instances but not necessarily in all. It is relatively easy to conjure up problems in connection with such joint use of a facility, but the proposal has possibilities that warrant its careful consideration.

Many fields and areas are serviced by what is generally known as "contract well servicing," and it is obvious that if all operators in a given pool or area used such a service, the equipment and incident manpower would be more efficiently utilized.

7. One operator for entire pool.—Many relatively small pools may have a half-dozen or more individual operators therein, with a consequent duplication of supervision, field offices, automobiles, trucks, servicing units and operating personnel. Again, it is obvious that if the operators in such a pool could and would agree to select one of their number to operate the

*Skelly Oil Co., Tulsa, Okla.

1939 . . . 2,500 tons — 1943 . . . 500,000 tons

These figures are staggering, and if the Axis War Lords have heard of them they must be staggered, too. Only a strong, vigorous nation like the United States, endowed with a wealth of raw materials—and a free, enthusiastic people—could undertake such a program and carry it to a successful conclusion.

The heavy responsibility for meeting this demand for more and more synthetic rubber, rests primarily with the manufacturers of refinery equipment. With typical American ingenuity and energy, they have shouldered the task. Truly, only the U. S. could do it.

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entire pool for their joint account, the saving in material and manpower would be of a substantial nature, and, incidentally, the operating cost should be materially reduced.

Where it is not possible to secure the operation of an entire pool, particularly a large one, it might, nevertheless, be possible to consolidate all leases in a segment of such a pool under one operation.

8. Jointly owned water and gas systems.—In this, as in all other proposals, there are problems and objections, none of which are necessarily insurmountable. It would seem logical, particularly in the early development stages of a pool or after full development, in the event no gasoline plant is built therein, for a plan to be formulated for single jointly owned water and gas systems, which would clearly eliminate the tremendous duplication of such facilities.

9. Joint use of manpower.—To the extent that the joint use of production facilities, by whatever method accomplished, can be promoted and effectuated we will have solved the manpower problem so far as is within our power to solve, for the simple reason that the two things go hand in hand.

10. Method of promoting program adopted.—Upon a method to promote the joint use of facilities, opinion seems to be unanimous, in that everyone with whom I have discussed the matter is in agreement that anything approaching compulsion would be doomed to failure in advance, and that the only way to get effective results is through voluntary cooperation.

There also seems to be unanimity of opinion that the most logical way to accomplish such voluntary procedure is through a proper and thoroughgoing publicity campaign in which the necessity for accomplishing the highest possible goal in the joint use of production facilities and manpower is stressed, to the end that countless operators who may not have given the matter much consideration may be as completely "sold" as is possible on the particular plan of procedure that practically fits into each particular situation. It seems to be the consensus of opinion that this can best be accomplished by:

(a) General education through publicity, stressing the voluntary feature and the constructive and economic benefits that should follow from the program's adoption.

(b) Channels suggested for such publicity are through the trade journals, the oil columns of the oil country press, and by presentation through meetings (such as this) of the various trade associations.

(c) Publicity, education and promotion of such a program by informed individuals addressing group meetings of superintendents and engineers in various fields or areas, on what the program contemplates, its importance to the war effort, and the advisability of the industry's doing its utmost to voluntarily accomplish everything possible inherent in the joint use of production facilities and manpower program. It would also doubtless be helpful to secure at such meetings a representative of the petroleum administrator for war's office and/or a representative of the director for production of the particular district.

Conclusion

I think I know individual oil producers' characteristics well enough to be positive I am on firm ground when I say that any such program as I am espousing must be absolutely voluntary to be successful. Upon that basis may I request your thoughtful consideration of any and all plans looking to a greater joint use of production facilities, and the attendant conservation of manpower, and urge your prompt and vigorous action to accomplish all that can be voluntarily done.

If the material and manpower situations become substantially more critical, we will probably be told where and how to do various things that are the subject of this memorandum. So, let us not wait for a directive from Washington, but do it now, voluntarily and in typical oil country fashion.

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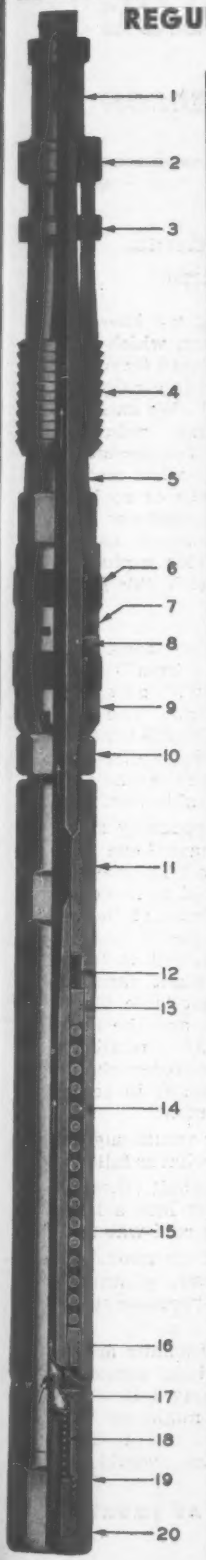
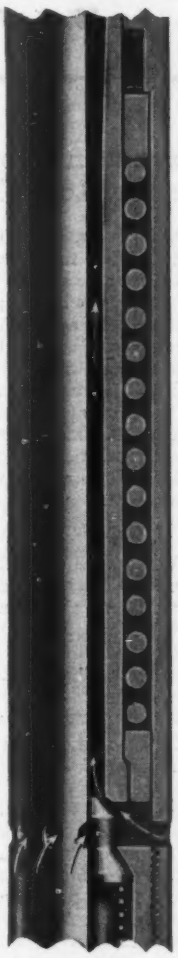
OTIS Sub-Surface Facts

No. 4 1943 DALLAS, TEXAS

REMOVABLE BOTTOM HOLE REGULATOR





Section Showing Adjusting Ring and Regulating Spring

PARTS LIST

1. *Slip Carrier*
2. *Slip Carrier Band*
3. *Mandrel Band*
4. *Slips*
5. *Mandrel*
6. *Otis Sealing Cup*
7. *Upper Sealing Cup Ring*
8. *Cup Ring Packing*
9. *Lower Sealing Cup Ring*
10. *Cup Nut*
11. *Valve Cage*
12. *Chevron Packing*
13. *Adjusting Ring*
14. *Regulating Spring*
15. *Valve Seat*
16. *Valve Seat Guide*
17. *Valve*
18. *Valve Spring*
19. *Valve Housing*
20. *Valve Housing Plug*

STOP SURFACE FREEZING WITH AN OTIS REMOVABLE BOTTOM HOLE REGULATOR

RATE OF PRODUCTION CONTROLLED FROM SURFACE

Adjusted to Desired Pressure Differential Before Installation

The Bottom Hole Regulator simply adds the surface-controlled rate of production to the advantages of bottom hole choking. The opening through the regulator automatically changes when the size of the surface choke is varied to allow for increase or decrease in rate of flow. The regulator is, in effect, simply a pressure operated variable bottom hole choke.

Tubing flowing pressures are at all times reduced by a predetermined amount, placing them within a safe workable limit.

As indicated in the illustration, a movable valve seat is urged against a valve by a heavy coiled expanding spring. Well pressure acting against the area of the movable valve seat raises it to permit flow up through the orifice in the valve seat. As a result, the flowing pressure above the valve seat is always less than the pressure beneath it by the amount of effective compression per square inch introduced into the spring. The compression placed in the spring is controlled by the thickness of the regulating washer used.

The amount of possible variation in rate of production through the regulator is that amount which the well, after having its flowing pressure so reduced, is capable of producing against line or separator pressure. This possible range in rate of production, after flowing pressures have been reduced to a safe, non-freezing point, is in some instances as high as 9,000,000 cubic feet per day.

TUBING ACTS AS A "MILE LONG HEATER"

The taking of the principal pressure drop through an Otis Removable Bottom Hole Regulator set at several thousand feet below the surface, allows natural formation heat to absorb all resulting temperature losses. The tubing string becomes a "mile long" heater—the most practical and reliable known. This "mile long" heater, unlike surface heaters, does not require constant attention and adjustment.

To withstand the abrasive action of flow through the regulator, heat-treated K-Monel valves and seats with Kennametal inserts are used. This combination of metals has been found to be the most resistant to flow-cutting of all metals tried to date, and has proved very satisfactory, even in high velocity wells that produce sand. Other parts of the regulator are made of regular Monel and stainless steel, to eliminate the corrosive action of sour crudes.

REGULATOR CAN BE RUN OR PULLED ON AN ORDINARY STEEL MEASURING LINE...

The Otis Bottom Hole Regulator is run or pulled under pressure on an ordinary steel measuring line without disturbing the tubing or well pressure. Otis service crews, trained and skilled in the installation of all Otis sub-surface tools, are available in most high pressure areas.

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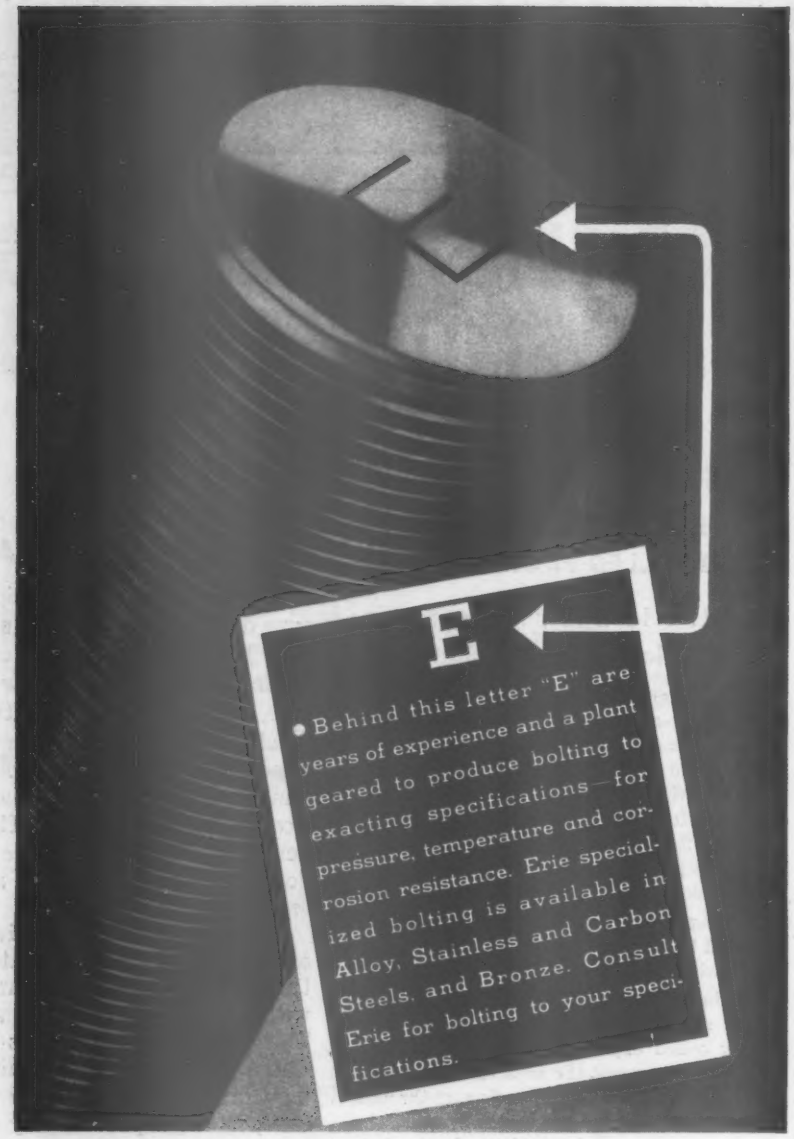
E
• Behind this letter "E" are years of experience and a plant geared to produce bolting to exacting specifications—for pressure, temperature and corrosion resistance. Erie specialized bolting is available in Alloy, Stainless and Carbon Steels, and Bronze. Consult Erie for bolting to your specifications.

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Today we are both working directly or indirectly for Uncle Sam—so we understand how important it is to concentrate on first things first. Regulations and restrictions set up by our government point the course we all follow. It means many times that personal service that has been so vital a part of our business life and all business life, must give way, temporarily.

The new things we are learning about specialized bolting, coupled with our old time idea on service, will profit our peace time customers when business gets back to normal again.

E-57

QUESTIONS on TECHNOLOGY

by W. L. NELSON

Asphalt in a Powdered, Dust, or Loose Form

On several occasions we have run into a high melt product which is in a chipped or semipowdered form. This is asphalt with a melting point between 240° and 275° F. We can produce asphalt of this melt point but we do not know how the product is handled in cooling and what method is used in order to flake or cool the product in small-sized particles. Can your technical department answer this or explain how this asphalt is handled in order to cool in this form? —A. A. S.

Very hard asphalts are sometimes used in a powdered or (small) lump form by mixing them with an aggregate and a flux material. The flux may be a material of 250-350 penetration and its function is to dilute or mix with the powdered asphalt to form a mixture of suitable hardness.

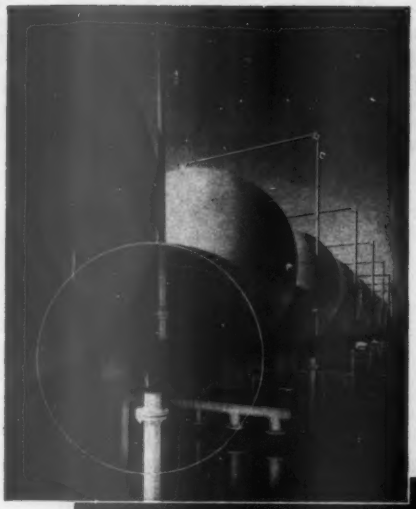
Many methods of producing small particles of asphalt have been proposed or have been used. The method that should be employed is, however, dependent on the hardness of the asphalt, the shape or size of particle desired, what the material is to be used for, and what plant facilities may be most readily available. These requirements are such, and the powdering of asphalt is such a relatively rare operation, that the process should be developed in the plant in somewhat large-scale equipment.

A chemical engineer would suggest general methods, somewhat as follows:

1. Spraying hot asphalt through somewhat small nozzles into a large amount of fast-flowing cold water.

2. A combination of (1) above except that the fine streams of asphalt are also hit by a high-pressure steam jet.

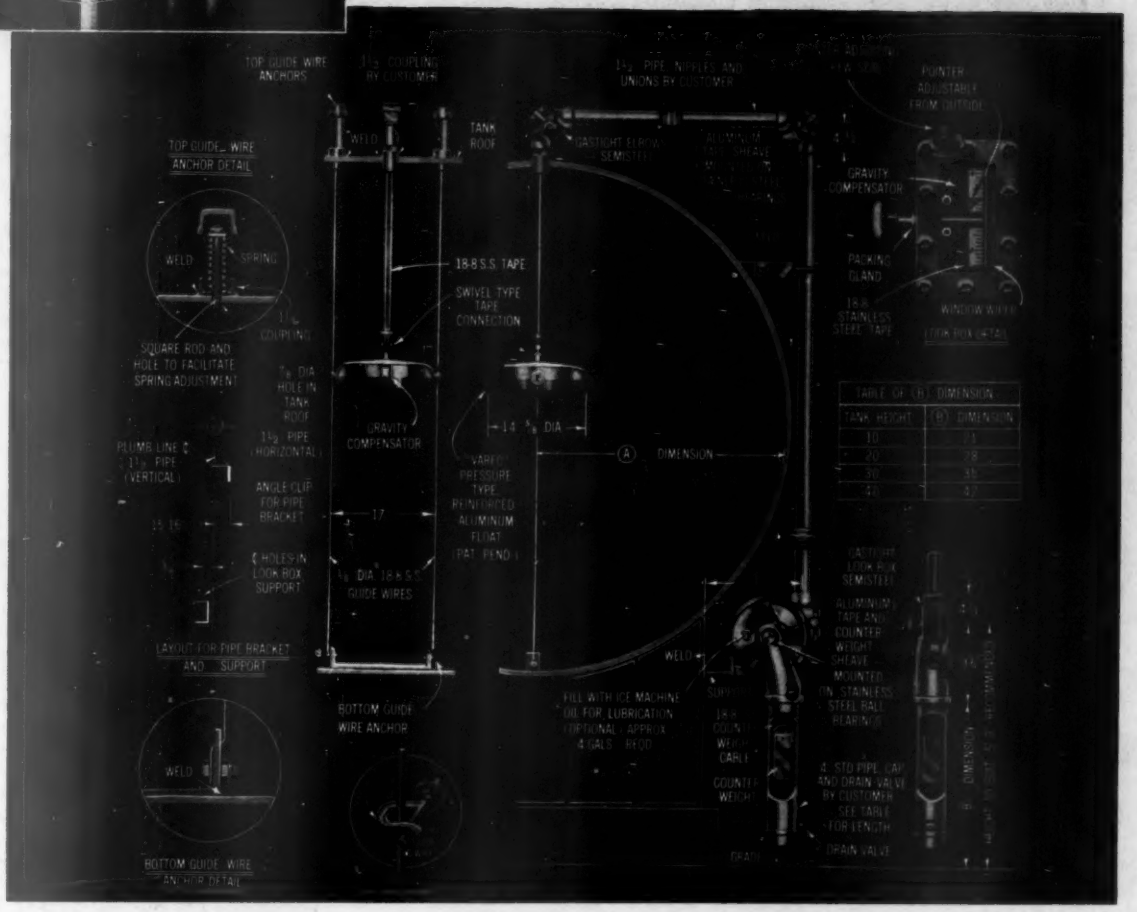
3. Some very hard asphalts are so brittle that they are ideal materials for hammer-bar grinding mills. The feed for such a mill might be prepared by extrusion of a 1 to 2-in. diameter round which would be



FOR ACCURATE TANK GAUGING

SPECIFY "Varec" APPROVED GASTIGHT AUTOMATIC

TANK GAUGES


TOP GUIDE WIRE ANCHORS
1½" COUPLING BY CUSTOMER
1½" PIPE NIPPLES AND UNIONS BY CUSTOMER
POINTER ADJUSTABLE FROM OUTSIDE
TOP GUIDE WIRE ANCHOR DETAIL
TANK ROOF
GASTIGHT ELBOW SEMISTEEL
GRAVITY COMPENSATOR
WELD
SPRING
18-8 S.S. TAPE
SWIVEL TYPE TAPE CONNECTION
PACKING GLAND
18-8 STAINLESS STEEL TAPE
WINDOW WITH LOCK BOX DETAIL
1½" COUPLING
SQUARE ROD AND HOLE TO FACILITATE SPRING ADJUSTMENT
⅞" DIA HOLE IN TANK ROOF
1½" PIPE (HORIZONTAL)
GRAVITY COMPENSATOR
14⅝" DIA
TABLE OF (A) DIMENSION
TANK HEIGHT | (A) DIMENSION
10 | 11
20 | 21
30 | 31
40 | 41
PLUMB LINE ℄ 1½" PIPE (VERTICAL)
ANGLE CLIP FOR PIPE BRACKET
(A) DIMENSION
"VAREC" PRESSURE TYPE REINFORCED ALUMINUM FLOAT (PAT. PEND.)
℄ HOLES IN LOCK BOX SUPPORT
⅛" DIA 18-8 S.S. GUIDE WIRES
LAYOUT FOR PIPE BRACKET AND SUPPORT
GASTIGHT LOCK BOX SEMISTEEL
ALUMINUM TAPE AND COUNTER WEIGHT SHEAVE MOUNTED ON STAINLESS STEEL BALL BEARINGS
WELD
FILL WITH ICE MACHINE OIL FOR LUBRICATION (OPTIONAL) APPROX 4 GALS. REQ'D
BOTTOM GUIDE WIRE ANCHOR
18-8 S.S. COUNTER WEIGHT CABLE
COUNTER WEIGHT
4" STD PIPE CAP AND DRAIN VALVE BY CUSTOMER SEE TABLE FOR LENGTH
DRAIN VALVE
BOTTOM GUIDE WIRE ANCHOR DETAIL

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Vapor Recovery Systems — Pressure and Vacuum Relief Valves — Flame Arrestors — Explosion Relief Valves — Pressure Regulators — Gauge and Thief Hole Covers — Tank Gauges — Swing Joints — Sheave Brackets — Tank Winches — Nozzles — Flanges — Sediment and Drip Traps — Clamps — Manometers — Drain Elbows — Check Valves — Still Valves and other tank appurtenances.

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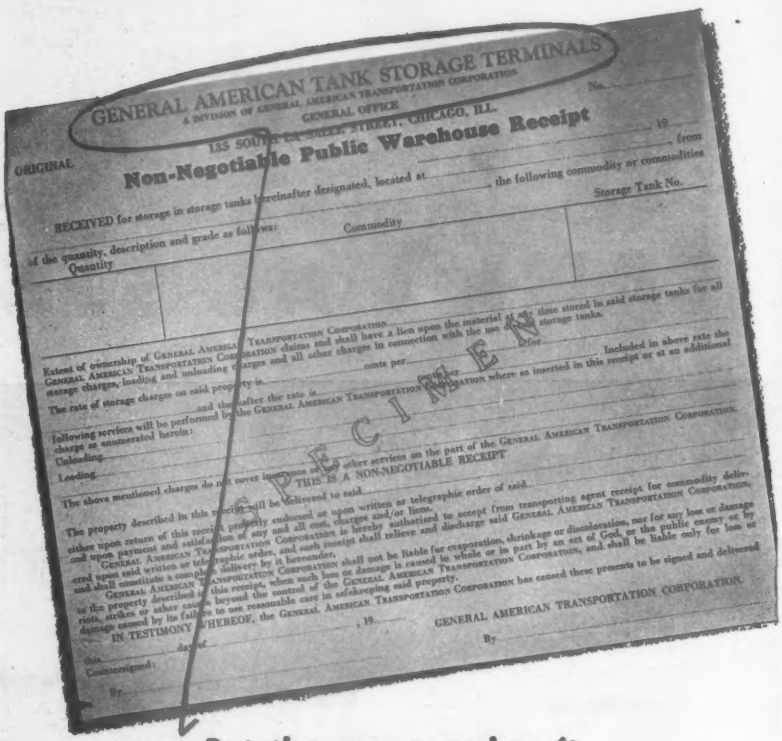
GENERAL AMERICAN TANK STORAGE TERMINALS
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cooled by a spray of cold water until it is hard enough to break into pieces.

4. Atomization by an air or gas blast, collecting the dust into water. (U. S. Patents 1441904 and 1698877).

5. Trituration with cold water (U. S. Patent 1699536).

6. Centrifuging (U. S. Patent 128,-9892).

And for the production of sponge asphalt:

7. Mixing air and asphalt by directing streams of the two materials against one another (U. S. Patent 1401974).

8. Add sodium bicarbonate to the asphalt (U. S. Patents 1513382 and 1591670).

9. Saturate asphalt with gas at a high pressure, cool, and release the pressure (U. S. Patent 1630103 and Can. Pat. 276488).

Oil Used in Lubricated Gasolines

We are interested in securing information about the mixture of oil with gasoline in storage tanks, capacity of 8,000 to 12,000 gal. Maybe you could give us some idea as to the type of oil and the amount of oil that is added.—W. C. J.

Refined lubricating oils of the S.A.E. 20 variety appear to be most popular as an upper-cylinder lubricant although light oils such as gas oil, and nonviscous neutral oil have been used, and at least one operator uses a heavy lubricating oil (S.A.E. 40). The light oils might be superior because they would drain more easily from the walls, thus not be coked into a hard mass, they might also vaporize from the surface, but they would not provide much lubrication value.

The amounts used range from 0.2 per cent to as high as 2.5 per cent. At least experimentally, a percentage of 5 per cent has been used. The factor of cost would appear to be of vital importance. The lightest oils used (gas oil or nonviscous neutral) are not much more expensive than gasoline, but the regular motor oils (S.A.E. 10 to 40) sell at 3 to 10 cents per gallon more than the cost of gasoline even if they are made by the user by blending suitable neutral and bright stock materials which can be purchased at a low price.

A discussion of these and other related facts were discussed in the following articles which appeared in The Oil and Gas Journal, October 30, 1941 (p. 46), June 19, 1941 (p. 61), December 8, 1941 (p. 28), December 29, 1942 (p. 9), and April 2, 1942 (p. 43).

The mechanical or plant equipment is not complicated but it must function perfectly in making a uniform

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300 lb., 1400 x 24 swamp-buggy tire, recapped by McDermott.

This battery of recapping molds is only a part of McDermott facilities.

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mixture of gasoline and oil. In a general way, the flow diagram, given on page 50, The Oil and Gas Journal, October 9, 1941, could be used with only minor changes even though it is laid out for the blending of gasoline and natural gasoline. Other ideas may be gained from Fig. 173 in Petroleum Refinery Engineering (McGraw-Hill Book Co., New York, N. Y.), page 590 of the second edition, and the discussional matter found there. The system required consists essentially of two main storage tanks or vessels for gasoline and oil, one or two blending (and/or storage) tanks, and a circulating pump by which the main constituent can be withdrawn and returned to its storage tank while the smaller constituent is being added, as well as to circulate the material after the addition is completed.

Efficient Production Rate

(Continued from Page 62)

veloped into the principle of efficient rate and has proven to be the means bringing proration to its present state of development as a successful regulatory measure. Efficient rate of production is the fundamental basis on which the system of allocation under proration should be based. The respected conclusions of Mr. Joseph E. Pogue[3] are in part as follows:

"In its more advanced areas of application, proration has established the optimum-rate concept as a working principle. . . . Experience has clearly demonstrated that the best results are obtained if the output of each pool is adjusted to its most efficient rate, and engineering technique is rapidly developing whereby this criterion can be broadly and effectively utilized. . . . "

Without any intention of detracting from the main conclusions of that author, the following observation may be made. All conceptions of efficiency arise fundamentally from the scientific procedure of constructing models for the purpose of making repeated experiments to provide information that ultimately converges to a conclusion of fact. By that process models of engines are constructed after a variety of designs which, after trial and error tests, lead finally to conclusions that one model representing one design, if operated at a particular speed, will provide the most efficient operation under particularly specified load conditions. This experimental procedure is the foundation of natural science and has been largely responsible for developing our industrial technology. But oil and gas pools can be produced only once. There is no second time when the entire machine can be reassembled and produced over again. For that reason the oil producer will be forever denied the privilege of determining by actual experience "the most efficient method" or "the most efficient rate" of producing a reservoir.

That does not mean, however, that basic engineering procedures can never be applied to determine new standards and new ways of achieving efficiency in operation. Many scientific facts can still be established and without resorting to completely indirect methods, these facts in the light of experience can be relief upon to develop a more sound production practice. If time is too long, or, if detail in desirable facts are still lacking, there is still that ability to do what the human race has always done —use common sense and judgment in the light of experience. It may be, that for the immediate present, that method of concluding that rate of withdrawal does have significant influence on the efficiency of operation may have to be relied upon.

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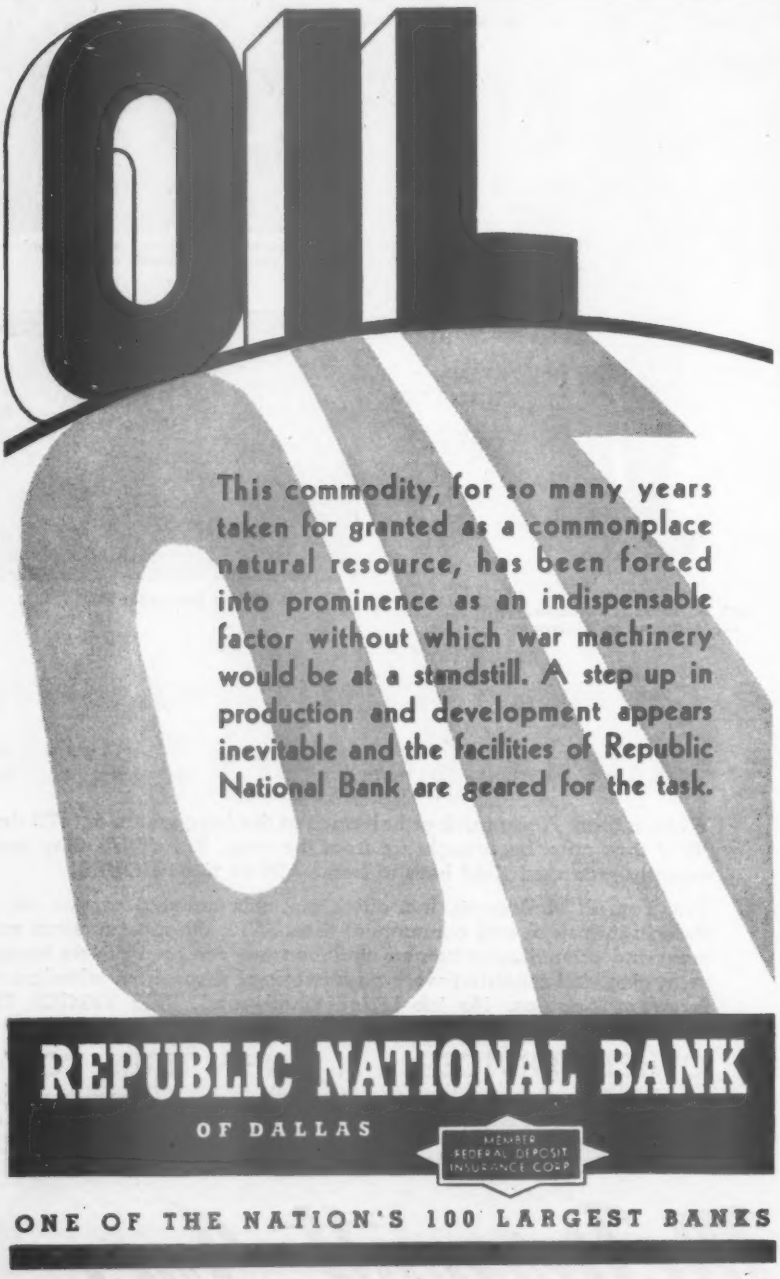
3. "A Design for More Effective Proration," Joseph E. Pogue, Petroleum Development and Technology, Vol. 132, p. 206 (1939).


OIL
This commodity, for so many years taken for granted as a commonplace natural resource, has been forced into prominence as an indispensable factor without which war machinery would be at a standstill. A step up in production and development appears inevitable and the facilities of Republic National Bank are geared for the task.
REPUBLIC NATIONAL BANK
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MEMBER FEDERAL DEPOSIT INSURANCE CORP
ONE OF THE NATION'S 100 LARGEST BANKS

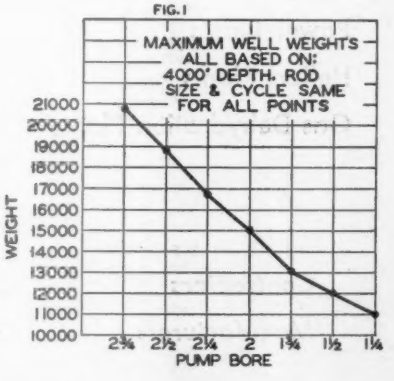
REDUCTION OF SUCKER-ROD EXPENSE

DURING the past year, sucker-rod costs have increased in corrosive areas. A still higher level is expected to result in the future because of the reduction of sucker-rod steel allocations, and a modification of the alloys previously used in manufacturing corrosion-resisting rods. The following summarized program covers the major steps which should be taken if sucker-rod operating expense is to be held at a minimum point:

Care and handling of sucker rods.—The first step in such a program should be in the form of a talk to all pulling-unit crew members. Emphasis should be placed on the economic importance of careful handling during servicing operations. Also, the fact should be pointed out that nicked rods, kinked rods, and rods which have been greatly overstressed while unseating stuck pumps, will eventually cause an increase in operating cost through excessive breakage.

Reduction in pump size.—A survey should be made, and smaller-bore pumps should then be installed in all wells where a reduction in pump size will not decrease the normal production. The important of this is illustrated in Fig. 1, showing the substantial reduction in maximum well weight which may be effected through the use of smaller-bore pumps. These calculations are all based on the same-sized rods and same cycle. However, in actual cases, a substantial reduction in pump size will permit the use of a lighter rod string, thus reducing both the well weight and cost of the rod string.

FIG. 1



Recovery of alloy rods.—In the past, many operators have used alloy rods as a precautionary measure in wells where the intensity of the sulfide condition was in doubt. Therefore, a survey should be made and all alloy rods recovered (substituting carbon steel rods in their place) for use in corrosive wells. S.A.E. 4620 sucker rods, which have been used with considerable success in corrosive areas, contain 1.5 to 2 per cent nickel and 0.20 to 0.40 per cent molybdenum and are now practically unobtainable. Since the performance of alloy rods to be manufactured in the future cannot be predicted, the S.A.E. 4620 rods now on hand should be used in wells where the greatest economic benefit will be derived.

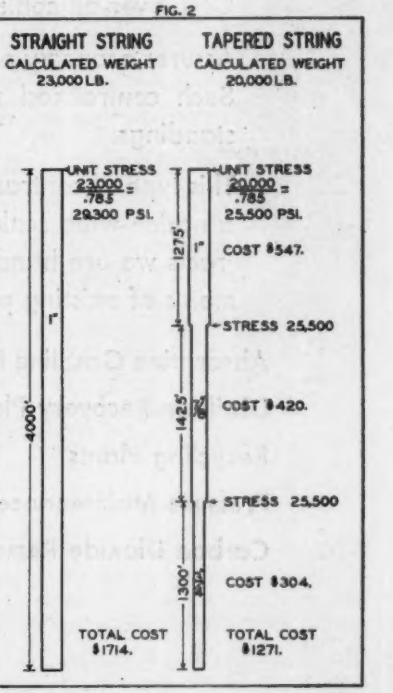
Slower pumping cycle.—In the case of large-volume producing wells there is the general belief that the maximum pumping cycle must be maintained in order to hold production. While this is probably true in a majority of cases, one operator selected a number of wells being pumped at maximum speed and stroke and found that, after a slight speed reduction, the decrease, not only in rod expense, but also in engine and rig-front expense, greatly offset the loss in production which occurred in a few of the wells. A 4,000-ft. well operating at 25-72 in. s.p.m., for example, weighs approximately 23,200 lb. under assumed conditions; whereas, if the speed were reduced to 21 s.p.m., the maximum weight would be approximately 22,200 lb. This reduction in weight would account for a 1,300-lb. per sq. in. decrease in rod stress. In a case of this kind, where rods are being operated at stresses exceeding the endurance limit, a slight reduction of the stress is often sufficient to effect a saving in repair cost.

Tapered rod strings.—Despite the fact that many companies have used tapered rod strings for over 12 years, some operators still use one-way strings in all wells. At this time particularly, the use of tapered sucker-rod strings should be considered as one of the most important means of reducing rod expense. Fig. 2 shows a stress-cost comparison between a straight string and a three-way tapered string of rods, calculated on the basis of the following well data:

Depth	4,000 ft.
Tubing size	2½ in.
Pump bore	2¼ in.
Corrosive condition	High
Pumping cycle	26-54 in. s.p.m.
Estimated well weight	20,000 lb.

The type of rod extensively used in corrosive wells has a hydrogen sulfide endurance limit of approximately 23,000 lb. per sq. in., and when it is possible, the rod string should be designed so that the unit stress does not exceed this limit. In Fig. 2 it should be noted that, under the maximum well load the stress imposed on the tapered string is approximately 15 per cent less than that of the straight string; and also that the initial cost of the tapered string is $443 or 26 per cent less than the cost of the straight string. This strength and cost advantage is in favor of the tapered string in all calculated combination strings; although there is, of course, a variation in the amount of mechanical and economic gain.

FIG. 2



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Engineering Fundamentals

No. 89

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

SUBSURFACE PRESSURE GAGES

A—Humble Gage

HUMBLE subsurface pressure gages are manufactured with two types of recording mechanism: the maximum recorder type, and the clock recorder type. The former obtains a single pressure for the greatest depth to which the gage is run, while the latter makes a pressure traverse that can be used to estimate pressures for any depth through which the instrument is lowered. These gages are also made with two different models of pressure elements which differ very little in design, and do not differ at all in regard to operating instructions.

The older model of Humble clock-recorder type gage (most commonly used) is illustrated in Fig. 1. Dimensions are shown on the drawing. This gage weighs about 17 lb.

The gage is composed of three principal parts: the helical-spring pressure element, the recorder drum, and the clock. The fluid pressure in a well is admitted through ports near the top of the gage and acts upon a piston attached to the lower end of a helical spring. Downward movement of the piston through a packing gland is resisted by the tension of the spring, and the extension of the spring is a measure of the pressure on the piston. The upper end of the spring is attached to an adjustable anchor. The lower end of the piston extends through a packing gland into the recorder section of the gage, and carries a stylus which records pressure variations on a chart within the recorder drum. A thermometer section, which will accommodate a maximum recording thermometer, is provided at the bottom end of the gage.

Using ordinary care, pressure readings can be obtained with an accuracy of ±0.5 per cent. Using special precautions, the readings should be accurate to ±0.25 per cent. Pressure readings with this high a degree of accuracy can be obtained over any desired range up to 6,000 lb./in.² or higher, if necessary, by equipping the gage with proper spring elements. Springs are available for the following approximate maximum pressures: 1,100, 1,500, 2,000, 3,000, 4,000, 5,000, and 6,500 lb./in.² Special springs can be made for the gage. Use of springs for a maximum pressure of less than 1,100 lb./in.² is not recommended.

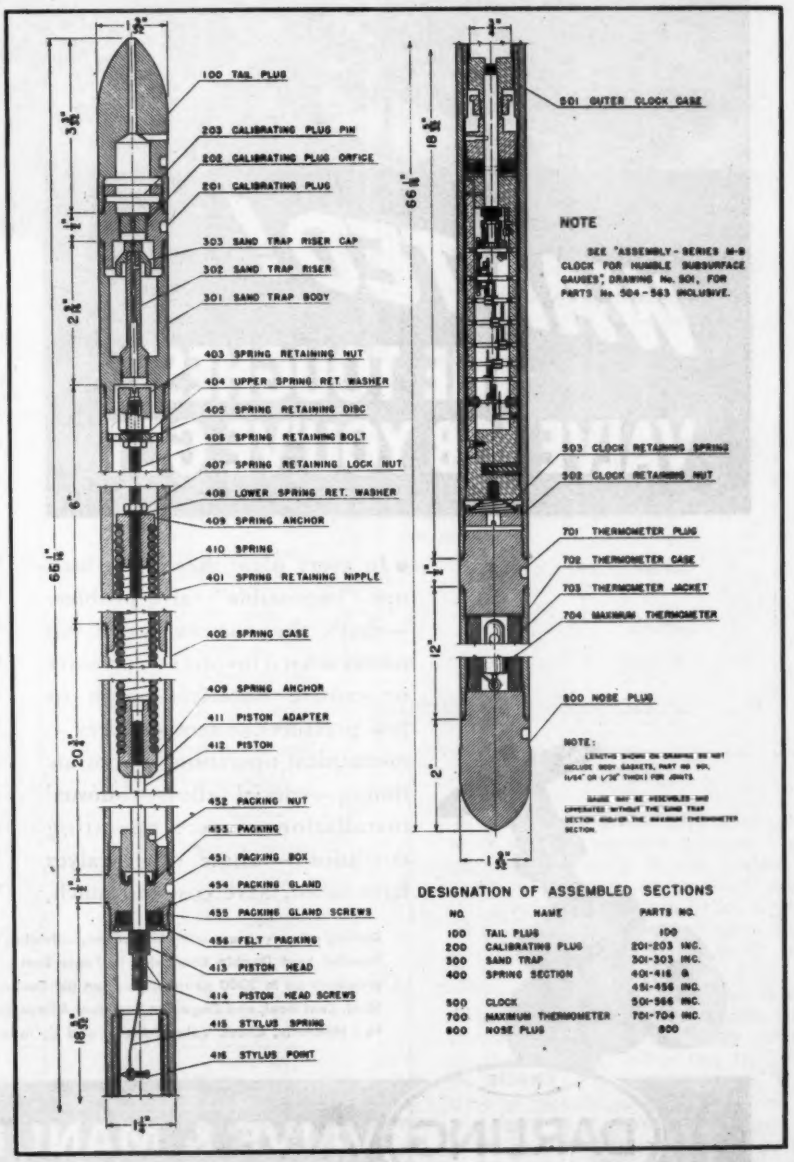
Clock recorder mechanisms are provided with various chart speeds and running times suitable for the different running schedules encountered in pressure surveys and productivity-index tests. There are three clocks available: the 22½-minute clock, the 1-hour clock, and the 2-hour clock. For each clock, the time refers to the period required for the clock to turn the drum one revolution. All of the clocks run about 10 revolutions with one winding.

The maximum piston extension of the gage is 5.4 in. The length of the time abscissae corresponding to one revolution of the clock is 2¼ in.

Brass sensitized indicator-card paper and a brass-pointed stylus are used for obtaining pressure record.

Body-joint gaskets, packing, and special tools for assembling and dismantling operations are furnished with new gages.

Complete instructions regarding the



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300	SAND TRAP	301-303 INC.
400	SPRING SECTION	401-416 & 451-456 INC.
500	CLOCK	501-566 INC.
700	MAXIMUM THERMOMETER	701-704 INC.
800	NOSE PLUG	800

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

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At your service are the engineers of the Darling Valve & Manufacturing Co. Working with actual field problems for over 40 years, this staff has met and solved almost every possible type of valve problem—perhaps the very one you are faced with now. Their service is yours without cost or obligation. Write or call the Darling Valve & Manufacturing Co., Williamsport, Pa.

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care and operation of the gage are furnished with new gages. Some of the more important points from such instructions will be mentioned here.

In order to obtain consistently accurate results, a gage must be calibrated both under conditions of increasing pressure and under conditions of decreasing pressure. This requires special care in placing weights on the deadweight tester during the calibration process in order to be sure that conditions of increasing pressure and decreasing pressure are actually secured when intended. Special care must also be exercised in obtaining a reading in a well to ease the gage to a gentle stop at the testing point so that the operator will use the proper calibration curve in obtaining the true pressure.

The gage must be kept clean in order to get accurate results and a long period of trouble-free service. This is true of any gage, regardless of the make. The spring section of a Humble gage should be kept filled with liquid soap to prevent corrosion by well fluids. The sand trap should be cleaned occasionally depending upon the amount of sand and trash in the well fluid. On the average, this cleaning is required once for about every four or five wells.

It is important that a gage be frequently recalibrated in order to obtain the highest degree of consistent accuracy. On the ordinary field survey this should be done at the beginning and end of a short survey, or every day or two on a lengthy survey. It is particularly important to recalibrate if the gage has been overhauled or has been idle for a period of time.

Calibration procedure and technique recommended by the manufacturer in greater detail should be carefully studied and followed.

B—Amerada Gage

THE Amerada gage (Fig. 2) is composed of three principal parts: the helical tube pressure element, the chart holder, and the clock. The helical pressure tube is open at the bottom end and closed at the top. The well pressure is communicated through a port near the bottom of the gage to the inside of the helical tube. Screens are provided at the lower end of this helical tube to prevent entry of sand and other extraneous solid material. A stainless steel bellows can be obtained to replace these screens. The bellows prevents well fluids from entering the tube and thus prevents corrosion of this part of the instrument. Use of this bellows is recommended if the gage is to be used in fields producing sour crude oil. The pressure on the inside of the helical tube causes it to uncoil, the amount of uncoiling motion being proportional to the pressure inside the tube. The

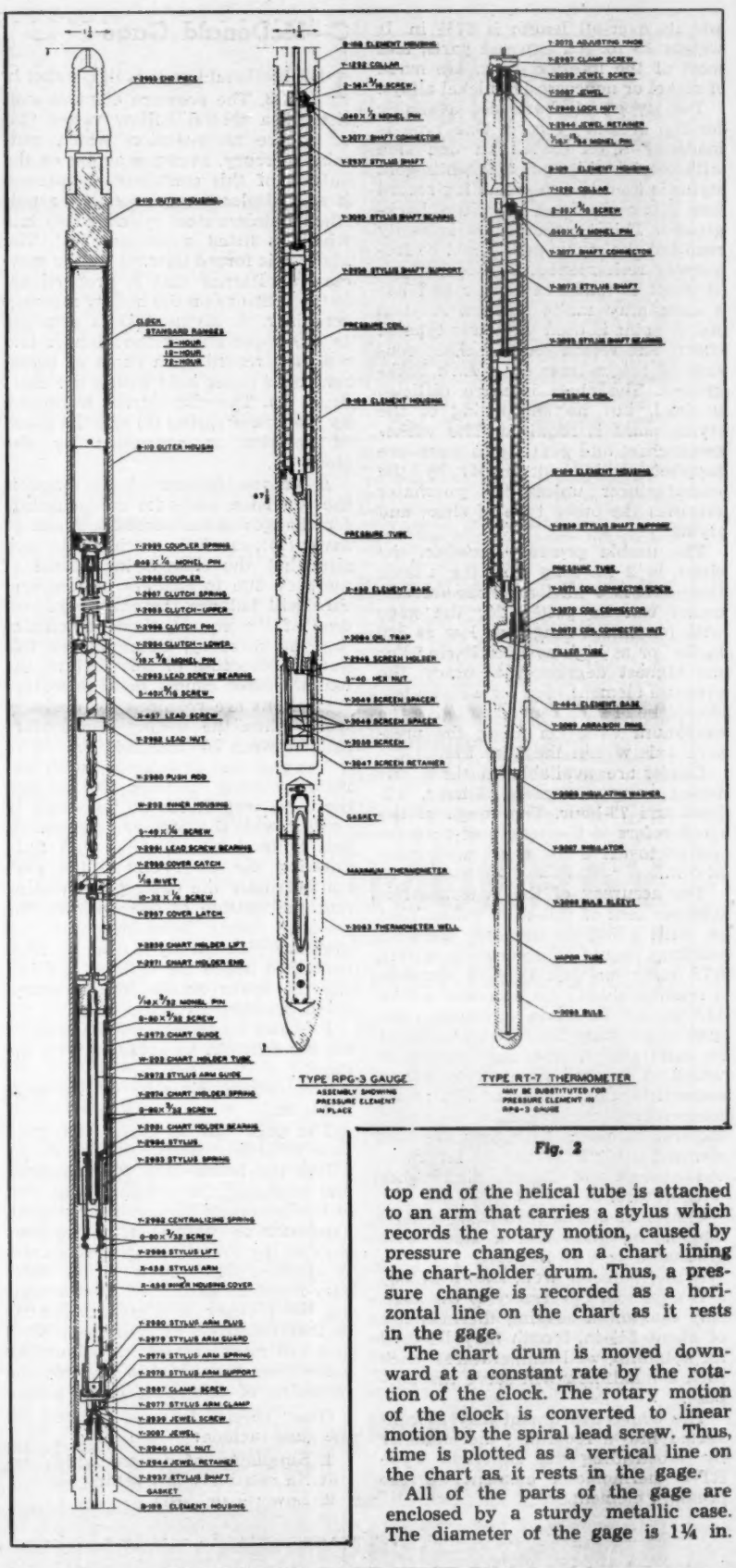
TYPE RPG-3 GAUGE
ASSEMBLY SHOWING PRESSURE ELEMENT IN PLACE
TYPE RT-7 THERMOMETER
MAY BE SUBSTITUTED FOR PRESSURE ELEMENT IN RPG-3 GAUGE

Fig. 2

top end of the helical tube is attached to an arm that carries a stylus which records the rotary motion, caused by pressure changes, on a chart lining the chart-holder drum. Thus, a pressure change is recorded as a horizontal line on the chart as it rests in the gage.

The chart drum is moved downward at a constant rate by the rotation of the clock. The rotary motion of the clock is converted to linear motion by the spiral lead screw. Thus, time is plotted as a vertical line on the chart as it rests in the gage.

All of the parts of the gage are enclosed by a sturdy metallic case. The diameter of the gage is 1¼ in.

and its over-all length is 67½ in. It weighs 15 lb. All exposed parts, and most of the interior parts, are made of nickel or noncorrosive nickel alloys.

Two types of charts are available for the pressure record. One type is made of brass coated on one side with special white paint. A white gold stylus is used and the resulting record has black lines on a white background. This type of chart is easily read but the stylus point must be frequently resharpened. The other type of chart is made of copper and has a dark gray matte surface. A steel stylus point is used with this type of chart. The record on this chart consists of bright lines on a dark background. The chart is more difficult to read, but no sharpening of the stylus point is required. The white-faced chart and gold stylus point are supplied with instruments by the manufacturer unless the purchaser specifies the other type of chart and stylus.

The usable pressure axis on the chart is 2 in. long and the usable time axis is 5 in. long. Pressure elements can be gotten for the gage with maximum ranges as low as 300 lb./in.² or as high as 7,000 lb./in.² For the highest degree of accuracy, the pressure element used for a given test should be of such range as to give the maximum variation along the pressure axis within the 2-in. limit.

Clocks are available in three different ranges: namely, 3-hour, 12-hour and 72-hour. The range of the clock refers to the length of time required to drive the chart a distance of 5 in.

The accuracy of the instrument is 0.25 per cent of full-scale value. That is, with a 300-lb. pressure element, readings should be accurate to within 0.75 lb./in.² or with 7,000-lb. element, a reading should be accurate within 17.5 lb./in.² To attain this high a degree of accuracy the instrument must be calibrated at the temperature at which it is used or a temperature correction must be applied to a room-temperature calibration. The manufacturer furnishes with each pressure element calibration curves for room temperature and one specified higher temperature.

Charts should be read using a hand magnifying glass and a steel scale graduated to 0.01 in.

A thermometer well, shown in Fig. 2. is a standard accessory to the gage. Any maximum reading thermometer of about 5½-in. length may be used for obtaining well temperatures when such a maximum will serve the purpose.

The whole instrument may be converted into a recording thermometer by substituting the Amerada Type RT-7 thermometer element for the pressure element.

C—McDonald Gage

THE McDonald gage is illustrated in Fig. 3. The pressure element consists of a special hollow vessel (24) of square cross-section which contains mercury. Pressure acting on the outside of this container compresses it and displaces mercury into a polished stainless steel cylinder (19) into which is fitted a plunger (14). The plunger is forced upward by the mercury a distance that is proportional to the pressure on the hollow mercury container. A stylus (11) is attached to the upper end of the plunger and makes a record on a chart of brass-sensitized paper held within the chart drum (7). The chart drum is rotated by the power spring (9) and the speed of rotation is controlled by the clock (2).

A unique feature of the gage is the provision made for compensating for changes in temperature. A bar of Invar (25), carefully machined to such size that the change in volume of mercury due to changes in temperature will balance the change in volume of the square element containing the mercury, accomplishes this purpose. Because of this feature, the manufacturer claims no temperature corrections are required for ordinary work when the testing temperature falls between 30° and 150° F.

The gage can be equipped with corrosion-resistant bellows (28) so that corrosive well fluids do not come in contact with the pressure element. If this bellows is used, the well fluid entering the lower end of the gage contacts only the outer gage housing and the outside of the bellows, the pressure being transmitted to the pressure element by a special fluid contained inside the bellows and filling the space outside the mercury-filled pressure element.

Pressure measurements accurate to 0.5 per cent can be obtained with the gage.

The outside diameter of the gage is 1¼ in.

The gage can be easily converted to a recording temperature gage by filling the lower case with mercury and plugging the pressure-inlet port at the bottom. With this arrangement, expansion or contraction of the mercury in the lower case proportionately changes the volume of the mercury-filled element (24), thus actuating the plunger in a manner similar to that described in connection with pressure measurements. A laboratory calibration, then, makes possible the recording of temperatures in wells.

Other special features claimed for the gage include:

1. Simplicity of design, which results in relatively low selling price.
2. Low repair costs.
3. Few moving mechanical parts.
4. Rugged construction.

(To be continued)

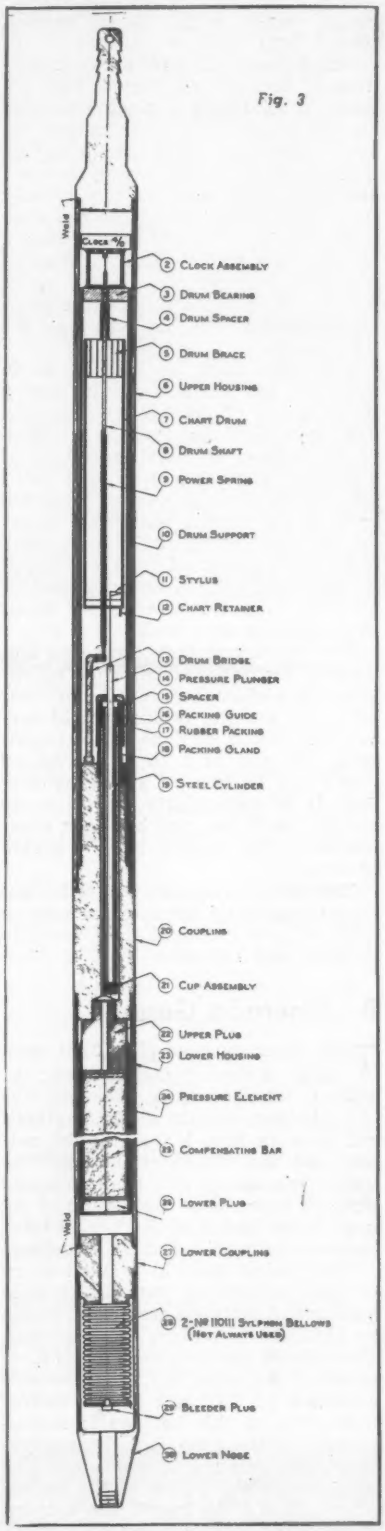

Fig. 3

REFINING

Specific Price Ceilings Set on Navy Fuel Oils

WASHINGTON, D. C. — Special Navy fuel oil was given specific dollars-and-cents ceilings by the Office of Price Administration last week generally comparable to those for other residual fuels of similar gravities.

Previously, maximum prices for this fuel oil were tentatively set for each seller, and varied.

With three exceptions, the ceilings for sellers anywhere in the United States will be either the previously established maximum prices or the ceilings designated in Revised Price Schedule 88 for residual fuel oil, according to gravity.

Amendment 102 brings Navy special fuel oil under Revised Price Schedule 88, effective May 18, 1943.

The three exceptions to the general rule are:

1. In price area D, comprising the Texas and Louisiana Gulf Coast, the ceiling will be the price in the gravity table or $1.05 per barrel, whichever is higher. In this particular area, where OPA previously approved a tentative maximum price higher than $1.05, this may be charged until May 30, 1943, after which the $1.05 level, or the designated price in the gravity table, prevails.

2. In California, the ceiling is fixed at $1.265 per barrel for all parts of the state except the San Francisco area, where the maximum price is $1.315 per barrel. Previously prices in California ranged from $1.214 to $1.265 per barrel mainly, with a few suppliers charging up to $1.43 per barrel.

3. In Oregon and Washington, sellers must continue to apply to OPA for a tentatively approved maximum price, as heretofore.

Microcrystalline Wax Put Under Allocation Order

WASHINGTON, D. C. — Microcrystalline wax and its blends, which are petroleum products, last week were placed under allocation control, effective July 1, by the War Production Board through issuance of Order M-195.

It provides that no supplier may use or deliver wax, nor can any person accept delivery, except as specifically authorized by WPB. The order provides for authorizations to suppliers to make deliveries on a quarterly basis. Provision is made on Form PD-600 for authorization to use or accept delivery of wax during any calendar quarter. Form PD-601 is to be used by suppliers for authorization to make deliveries of microcrystalline wax.

Codimer Unit Completed At Bay's Kansas Refinery

DENVER, Colo.—Bay Petroleum Corp. recently completed the construction and conversion of facilities at the McPherson, Kans., refinery for the production of codimer. The new unit is now in operation and is producing components for aviation gasoline.

C. O. Garbrecht of Denver is general superintendent for the company.

Colloidal Fuel Proves Suitable at Atlantic Plant

WASHINGTON, D. C. — Colloidal fuel, a mixture of pulverized coal and oil, can be used in many industrial boiler plants of the nation which were designed to burn fuel oil, "if careful study and sound engineering practice" are employed in each case, the Bureau of Mines reported last week to Secretary of the Interior Ickes. The bureau's conclusions followed a 1-month trial of colloidal fuel in the boiler plant of Atlantic Refining Co. at Philadelphia, Pa.

In the tests, a mixture of 40 per cent pulverized bituminous coal most of which was ground as fine as talcum powder, and 60 per cent No. 6 (Bunker C) fuel oil, was fed to a furnace using a steam atomizing type of burner. The test was run as part of the regular plant routine with existing equipment which was operated by the usual company boiler-plant employes. Company engineers cooperated with the bureau in the tests.

No difficulties arose in burning the colloidal fuel in the steam atomizing type of burner used, bureau engineers informed Secretary Ickes. The flame responded smoothly to changes of boiler load and to variations of the amount of air used for combustion. In general, the troubles from the ash of the coal in the furnace were less than anticipatel. Bureau engineers believe that the amount of fuel oil normally consumed by commercial fur-

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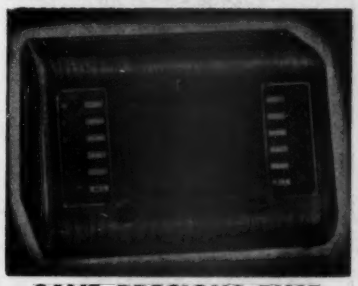

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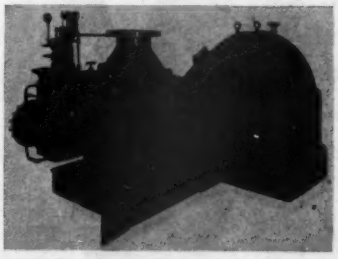

Geared high back pressure unit rated 1300 H.P. at 225 lbs. initial pressure, 500°F. total temperature and 130 lbs. back pressure. Drives generator and is equipped with oil relay governor and back pressure regulator to control electrical load in accordance with steam demands.

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A heavy Bourdon tube actuates the mercury switch. The Mercoid corrosion-proof mercury switch assures positive make and break in the electrical circuit during years of continuous performance.

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naces would be reduced one-third if colloidal fuel is substituted. Their research at the Atlantic plant was prompted by the acute fuel-oil shortage prevailing in certain parts of the country.

In the tests just completed, the bureau engineers said that more power generally was required to pump the colloidal fuel and, in general, pump capacities probably would be lower when handling the mixture of coal and oil. Because the mixture is abrasive, a varying amount of erosion probably will occur in pumps and burners, they added.

WPRA Hears Discussion Of Lubricants at Tulsa

"Pour Point Stability of Pour Depressant-Treated Lubricating Oils" is the subject of a paper by A. Bruce Boehm and Calib Hodges, Stanco Distributors, Inc., New York City, which was presented by the senior author before the technical group meeting of Western Petroleum Refiners Association in Tulsa on May 26.

The authors discussed results of exhaustive field tests carried out on cars during several winters throughout which these experiments have been conducted. Mr. Boehm showed how some oils may solidify unexpectedly above their normal pour points, and will show the effect of proportions of neutral and bright stocks, percentage of pour depressant and degree of dewaxing on pour-point stability.

New Turner Valley Plant Producing Aviation Fuel

CALGARY, Alta.—Following the installation of a first polymerization unit in its refinery in South Turner Valley, Gas & Oil Products, Ltd., has commenced production of aviation gasoline for use by the Royal Canadian Air Force. Standards set by the Government for aviation gasoline call for ratings of 87 and 80 octane, both of which the plant is qualified to manufacture. The refinery in Turner Valley consists of topping and cracking units.

Gases from the cracking unit are compressed and then scrubbed with a solution which removes the sulfur. These sulfur-free gases are further compressed and heated to the desired reaction temperature, at which time they are passed through a catalyst which converts them into aviation gasoline components. The polymerized gasoline is then separated from the residual gas and blended with regular refinery motor fuel.

The polymerized gasoline has an octane blending value of 90, so that, when blended with the refinery gasoline, the total blend is of a higher quality than it was formerly possible to produce.

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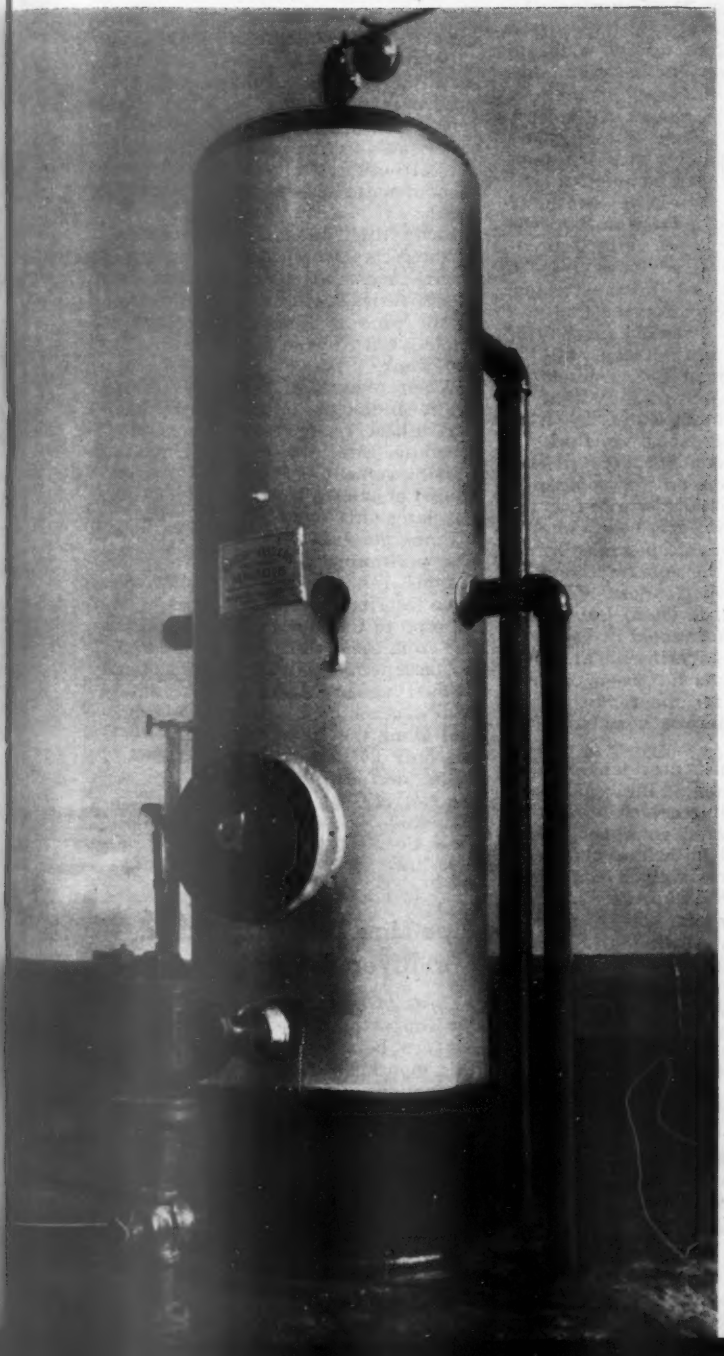

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A heavy Bourdon tube actuates the mercury switch. The Mercoid corrosion-proof mercury switch assures positive make and break in the electrical circuit during years of continuous performance.

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naces would be reduced one-third if colloidal fuel is substituted. Their research at the Atlantic plant was prompted by the acute fuel-oil shortage prevailing in certain parts of the country.

In the tests just completed, the bureau engineers said that more power generally was required to pump the colloidal fuel and, in general, pump capacities probably would be lower when handling the mixture of coal and oil. Because the mixture is abrasive, a varying amount of erosion probably will occur in pumps and burners, they added.

WPRA Hears Discussion Of Lubricants at Tulsa

"Pour Point Stability of Pour Depressant-Treated Lubricating Oils" is the subject of a paper by A. Bruce Boehm and Calib Hodges, Stanco Distributors, Inc., New York City, which was presented by the senior author before the technical group meeting of Western Petroleum Refiners Association in Tulsa on May 26.

The authors discussed results of exhaustive field tests carried out on cars during several winters throughout which these experiments have been conducted. Mr. Boehm showed how some oils may solidify unexpectedly above their normal pour points, and will show the effect of proportions of neutral and bright stocks, percentage of pour depressant and degree of dewaxing on pour-point stability.

New Turner Valley Plant Producing Aviation Fuel

CALGARY, Alta.—Following the installation of a first polymerization unit in its refinery in South Turner Valley, Gas & Oil Products, Ltd., has commenced production of aviation gasoline for use by the Royal Canadian Air Force. Standards set by the Government for aviation gasoline call for ratings of 87 and 80 octane, both of which the plant is qualified to manufacture. The refinery in Turner Valley consists of topping and cracking units.

Gases from the cracking unit are compressed and then scrubbed with a solution which removes the sulfur. These sulfur-free gases are further compressed and heated to the desired reaction temperature, at which time they are passed through a catalyst which converts them into aviation gasoline components. The polymerized gasoline is then separated from the residual gas and blended with regular refinery motor fuel.

The polymerized gasoline has an octane blending value of 90, so that, when blended with the refinery gasoline, the total blend is of a higher quality than it was formerly possible to produce.

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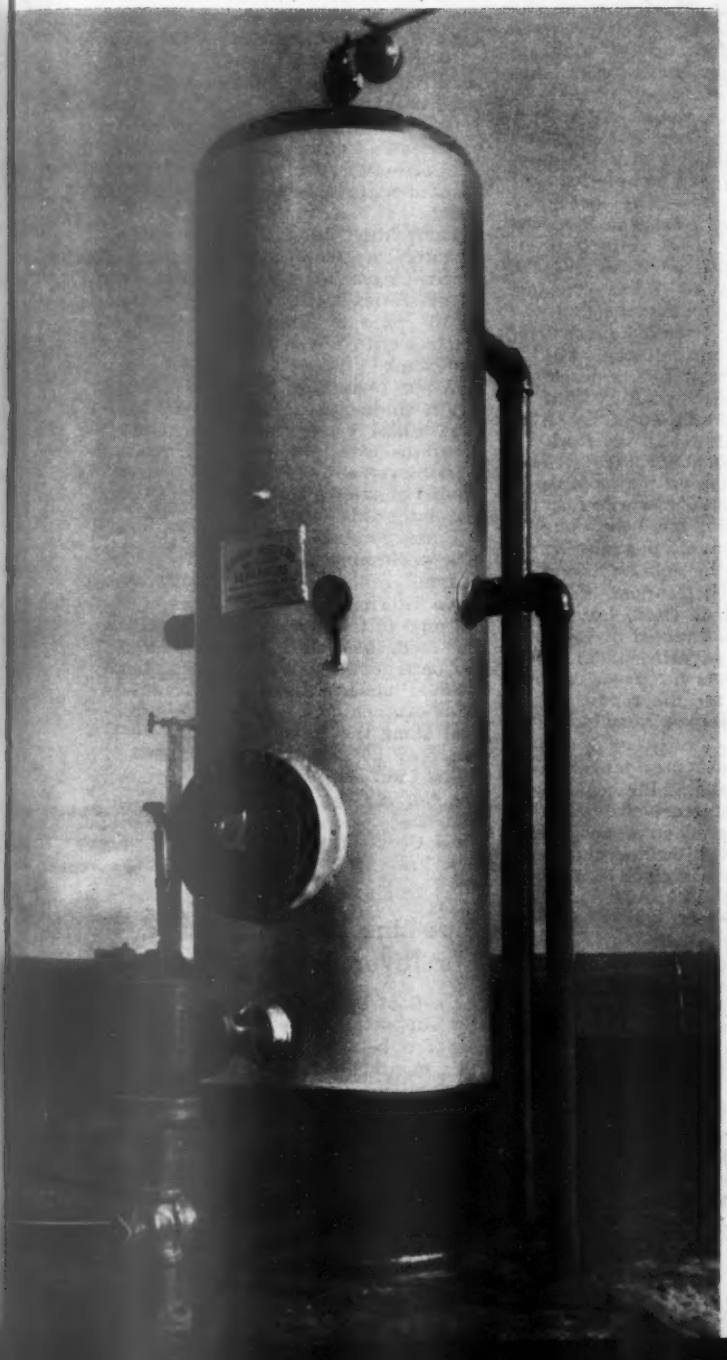

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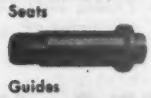

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PIPE LINES

WEP Lays Temporary Line Across Arkansas River

The surprise of the week has been the rapid construction of a temporary 20-in. line across the Arkansas River near Little Rock, Ark., which restored operation of War Emergency Pipelines, Inc., 24-in. crude-oil line Monday night, May 24, following the break due to flood which occurred just a week before on the night of May 17. The river cut back its bank 200 yards. The line may have been broken in several places. At present the water is 30 ft. deep. Pumping was resumed immediately after the temporary line had been completed.

Immediately after the break, 6 miles of 20-in. pipe in transit to the Gulf Coast-New York refined products line was diverted for laying the temporary Arkansas River crossing.

Special commendation is being given to the Rock Island Railroad for service to the oil industry and the federal Government by its quick response to the needs of the situation. Prompt permission granted by J. B. Farrington, chief executive, Rock Island Railroad, enabled WEP to lay the temporary line on that company's bridge. Construction work for the temporary crossing has been done by Williams Brothers Corp. under direct supervision on the job by David R. Williams, Guy S. Connors, Cecil A. Stanfield and H. L. (Red) Davis. The undertaking was directed by Oscar R. Burden, general superintendent, WEP.

A fleet of boats has been ordered to the location for the repair of the broken 24-in. line as soon as flood waters recede.

W. Alton Jones, president of War Emergency Pipelines, Inc., said:

"We have just received word that the best engineered emergency river crossings cannot withstand with certainty such extreme flood conditions as exist at Little Rock, Ark. Both sections of a deeply laid dual river crossing of a gas pipe line just above the 'big inch' crossing are reported washed out. The dual spans were approximately 500 ft. apart and were so laid as to secure the line, in so far as possible, against severe flood conditions. Nevertheless, they let go at about the same time that the damage occurred to the WEP. The severity of the flood simply outran all practicable engineering precautions that might have been undertaken to secure continuity of operation."

Harold L. Ickes, petroleum administrator for war, said:

"Block gates in the pipe line were closed immediately and the loss of crude oil flowing north from Longview, Tex., to Norris City, Ill., was held to a negligible amount."

Working closely with PAW and the Association of American Railroads, ODT petroleum transport officials are diverting the 9,000 tank cars which have been shuttling between Norris City and the eastern rail terminals. As PAW designates midwestern and southwestern points from which eastern refiners will obtain necessary shipments of crude, the required tank cars are ordered diverted by ODT to accommodate the temporary movements.

Early this week a large number of tank cars were reported to be at Norris City, ready to move oil as soon as deliveries were resumed. In spite of the pipe-line break 2,359 cars of crude were shipped from Norris City last week.

When pumping operations started again shipments of East Texas and Gulf Coast crude were moved. The schedule calls for commencing the first movement of West Texas crude from Longview, Tex., to Norris City, Ill., later this week.

Embargoes on all freight except oil and perishable goods placed on numerous railroads in the Southwest have interfered with deliveries of 20-in. pipe to the WEP refined products line from the Gulf Coast to New York.

Construction of WEP lines has been pushed ahead steadily. Fortunately bad weather conditions did not prevail along the entire route last week. On May 24, a total of 555 miles of 24-in. and 20-in. had been laid on the Norris City, Ill.-East Coast extension and 50 miles of 20-in. for the Gulf Coast-East Coast refined products line.

Pipe-Line Bridges Studied For River Crossings

Costs of building bridges especially for supporting pipe lines across rivers are being studied by engineers this month because a number of organizations are faced with the need of replacing lines at river crossings which have been broken in recent floods.

In a number of typical cases where bridges have been built for pipe lines

across large Mid-Continent rivers, the cost of building the bridge has been about 50 per cent more than installation of the line in the river bed.

The advantages of continuous service are said to outweigh the additional cost. So far, the long pipe-line bridges employed by the industry have been largely built for natural-gas lines. Recently there has been some discussion of advantages which may be attained by the joint use of pipe-line bridges by organizations having crude oil, refined products and natural-gas pipe lines crossing large rivers in the same area.

Two Product Lines Operate in Africa

Two refined product lines are supplying military operations in North Africa. According to a recent report from Allied headquarters in North Africa, one of these lines is 54 miles and the other 64 miles in length. Much emphasis has been given to the strategic importance of pipe-line connections with air bases in active theaters of war under modern conditions.

The Army has developed portable pipe lines to carry gasoline supplies to motorized units in the field, Office of War Information said in a review showing the difference between the petroleum needs of this and the first World War.

OWI said the new type of pipe line comes in self-contained ½-mile units, each complete with a centrifugal pump driven by a 25-hp. gasoline engine, and can be moved by cargo trucks and used independently of any other units.

Quoting Army Motors, publication of the motor transport school at the Baltimore Quartermaster Depot, OWI said:

"These self-contained sections, alone or in combination, are said to be able to deliver gasoline through swamps and forest or over mountains at a rate of approximately 200 gal. per minute.

"The pipe also can be used to assist or even replace floating gasoline tanks for ship-to-shore operations."

Illustrating this war's petroleum demands OWI said that:

A mechanized division burns up 18,000 gal. of gasoline an hour proceeding at normal speed; a heavy bomber at cruising speed uses 200 gal. and a fighter plane needs 100 gal. in an hour.

Monthly supplies for each American fighting man on a world battle front use 1½ tons of shipping space while the ships that carry these supplies to—say North Africa—average 214,000 gal. of heavy fuel oil for the round trip to Casablanca.

The amount of petroleum and petroleum products shipped overseas in the first 12 months of this war was more than 80 times that shipped in the first 12 months of the last war.

In the first year of the last war, this country sent just one airplane abroad, compared with thousands which went overseas last year.

Through experimentation and research, OWI said, the Army has developed "means it is not possible now to reveal by which fuel consumption can in many instances be saved."

Oklahoma Seeks Hugoton Gas Outlet

Walker Pound, conservation officer, and Earl Foster, attorney for the Oklahoma Corporation Commission, urged Petroleum Administration officials to lay the proposed pipe line to tap the Hugoton gas field in Oklahoma.

A 26-in. pipe line out of the field, which spreads over parts of Kansas, Oklahoma and Texas, is planned. It would have a capacity of 25,000,000 cu. ft. daily.

Oklahoma proposes that the pipe line extend from Texas County, Oklahoma, via Guymon to Blackwell and be connected there with the Cities Service Gas Co. system.

14,000 Cars Released By Large Tank Trucks

More than 14,000 railroad tank cars have been released from short-haul duty for more vital long hauls by the use of tank trucks, the Office of Defense Transportation announced recently.

The 14,000 tank cars represent one-fifth of all the petroleum moving east by rail, ODT said. It added that "the facility with which tank trucks handle short hauls is so great that, on the average, a single large tank truck unit can do the work of about 12 tank cars on hauls up to 100 miles and of about 6 cars on hauls of 100 to 200 miles."

"Tank trucks now are supplying virtually all of the air fields in Florida, Georgia, Alabama, Mississippi, Louisiana and about half of Texas."

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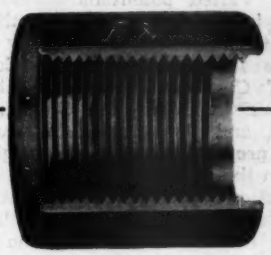

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Natural Gas

Medrano Sand Wells to Be Reopened Under New Rules

OKLAHOMA CITY, Okla.—Production of gas from the Medrano sand of the West Cement field, Caddo County, Oklahoma, will be resumed June 1, according to plans this week of the Corporation Commission which is completing studies of various conditions.

Medrano sand wells producing gas were ordered shut in at 7 a.m. May 18 to permit Corporation Commission study of conditions in the field, including bottom-hole pressures and to obtain all possible data that may be gained by the temporary interruption of withdrawals.

Need for revised production rules arose when Ray Stephens drilled an oil well on the south flank of the west Cement field which is producing oil from the Medrano sand with a capacity of approximately 1,000 bbl. per day. Varied potentials of gas wells and in pressures prevailing throughout the field made it virtually impossible for the Corporation Commission's Conservation Department to determine whether the Stephens' oil well and the previously developed gas production both were originating from the same sand.

Following a hearing on May 13, the commission determined that the best method of obtaining the necessary information for promulgation of proper orders, rules and regulations, would be to shut in the gas wells producing from the Medrano sand for 2 weeks.

United Gas Corp. Proposes Lower Rates for Texas

AUSTIN, Tex.—Proposed reductions in gas rates for customers of United Gas Corp. in 28 unincorporated communities and farm areas were heard here last week by the Texas Railroad Commission.

J. V. Strange of Houston, vice president and general manager of the company, said reduced gate rates ordered for those communities would save United Gas Corp. an estimated $558,191 a year, a substantial part of which he said would be passed on to consumers under the proposed burner-tip rates.

The schedule would apply to 4,317 customers.

The rates for unincorporated towns, Mr. Strange said, would be identical with those in incorporated cities of the same area. Since 1932, the company has reduced rates approximately $2,000,000 to consumers in incorporated cities, including Houston, Beaumont, Jacksonville, Longview, Marshall, Mineola, Nacogdoches and Wichita Falls, Mr. Strange testified.

Industry Advisory Committee Formed by WPB

WASHINGTON, D. C.—Twenty-one executives of the natural-gas industry have been appointed members of an advisory committee to the War Production Board, it was announced here last week with release of the personnel. Edward Falck, on the WPB staff, will serve as the presiding officer at advisory committee meetings.

At the same time, J. A. Krug, director of the Office of War Utilities, announced appointment of Paul R. Taylor, Montclair, N. J., as director of the bureau's natural-gas division. Mr. Taylor has been vice president of Stone & Webster Service Corp, New York.

Members of the WPB natural-gas industry advisory committee are:

B. C. Adams, president, Gas Service Co., Kansas City, Mo.; Thomas H. Allen, president, Memphis Light, Gas & Water Division, Memphis, Tenn.; F. M. Banks, vice president, Southern California Gas Co., Los Angeles, Calif.; John W. Batten, vice president, Michigan Consolidated Gas Co., Detroit, Mich.; B. R. Ray, president, Northern Natural Gas Co., Omaha, Neb.; Walter C. Beckjord, vice president, Columbia Gas & Electric Corp., New York; Paul Kayser, president, El Paso Natural Gas Co., El Paso, Tex.; E. V. Kesinger, vice president, Natural Gas Pipeline Co. of America, Chicago; W. G. Maguire, chairman, Panhandle Eastern Pipe Line Co., Kansas City, Mo.

N. C. McGowen, president, United Gas Pipe Line Co., Shreveport, La.; C. P. Rather, president, Southern Natural Gas Co., Birmingham, Ala.; James B. Black, president, Pacific Gas & Electric Co., San Francisco, Calif.; Joseph Bowes, president, Oklahoma Natural Gas Co., Tulsa; J. A. Brown, director, Commonwealth & Southern Corp., New York; Frank L. Griffith, vice president, Peoples Gas Light & Coke Co., Chicago; D. P. Hartson, vice president, Equitable Gas Co., Pittsburgh, Pa.; E. C. Joullian, president, Consolidated Gas Utilities Corp., Oklahoma City, Okla.; J. French Robinson, president, East Ohio Gas Co., Cleveland, Ohio; E. F. Schmidt, vice president, Lone Star Gas Co., Dallas, Tex.; H. Carl Wolf, president, Atlanta Gas Light Co., Atlanta, Ga., and Harry K. Wrench, president, Minneapolis Gas Light Co., Minneapolis, Minn.

Gas-Oil Ratio Order in Texas Panhandle Revised

AUSTIN, Tex.—Operators in the Texas Panhandle field last week were relieved of the duty of taking gas-oil ratio tests on oil wells and from reporting the data to the Railroad Commission.

Conservation Order 10-499, dated November 25, 1938, placing a limit on gas withdrawals from oil wells and providing for gas-oil ratio determinations in the Panhandle field has been amended to remove this specific requirement.

Natural Gasoline

Texas' Production Rises To 119,343 Bbl. Daily

AUSTIN, Tex.—Production of natural gasoline, condensate, butane-propane and other light products in Texas rose to 119,343 bbl. daily in March, it is disclosed in a report issued last week by the Texas Railroad Commission. Corrected production figures for February show the average for that month to have been 118,803 bbl. daily compared to 116,995 bbl. in January.

A slight increase in natural-gasoline production to 72,944 bbl. daily is reported for March compared to 72,702 bbl. in February and 72,670 bbl. in January. Condensate production rose to 24,618 bbl. daily in March against a corrected average of 23,968 bbl. in February and 22,706 bbl. daily in January.

Yield of butane and propane was nearly static. Average yield in March was 17,459 bbl. daily compared to 17,667 bbl. in February and 17,377 bbl. in January.

Other products, including pentane and isopentane, averaged 4,322 bbl. daily in March, 4,466 bbl. in February and 4,152 bbl. in January.

Texas' 28 cycle plants accounted for production of 36,454 bbl. daily of all liquid products in March while natural-gasoline plants yielded 71,843 bbl. daily. Pressure-maintenance operations accounted for 495 bbl. daily of liquid products.

Exploration and Drilling

Week's Highlights

REDUCTION of spacing requirements in eastern Kansas, eastern and southern Oklahoma and North Central Texas has been anticipated for some time. It will not result in the addition of any flood of oil to the nation's present output but it is doubtful whether any other area has better possibilities of increasing production with a minimum use of steel than these four districts.

It is unfortunate that the amended order covers crude oil only and does not take gas into consideration for there are many small structures which may yield gas in these areas in which there are many pipe lines and local markets. Eastern Oklahoma and Kansas are already importing large quantities of gas and as local supplies dwindle they may become entirely dependent on gas from larger fields outside of the area. The small pools in these sectors require closer spacing than large high-pressure pools but even fair wells will pay out in a year or two becoming depleted along with existing fields. If existing fields are depleted before these others are drilled, the latter may prove uneconomic.

In its press release accompanying the order, PAW states that these districts have been combed thoroughly, but recent developments indicate that they have not been as thoroughly combed as the number of fields and the record of past production would indicate. When many of these fields were developed, little was known of the possibilities of deeper sands. In fact, many structures were produced from depths of 1,000 ft. or less and abandoned without deeper drilling. Sometimes the deeper drilling was done on a well which was dry in the upper pays so that the structure was abandoned in the deeper levels with only a single offstructure test.

Some of the structures were abandoned after producing only a fraction of the recoverable oil as a result of improper recovery methods. These can again be opened up profitably and this redrilling need not involve the establishment of secondary-recovery methods. That the value of properties in this area is not confined to small stripper production is indicated by the manner in which major companies have been acquiring them in recent years.

The areas reopened by this new order are all districts with multiple sands and a well started on a favorable location has several chances of success. They also are areas which were opened up many years ago with big production in the early fields, which, after the manner of all plays gradually diminished in importance. However, probably the principal reason for the declining interest was the opening of new flush production elsewhere.

The new order strikingly calls attention to the need for more oil from Oklahoma. Actually, it might as well have included the whole state as there is no oil production in the area not embraced by it. If any is found, it is unlikely that it will be at depths shallow enough to be affected by the order.

Many operators today think in terms of large wells, not realizing that profits are made on the basis of the oil produced, not on the well's potential and that good wells are generally prorated severely. A 25-bbl. well, settling to 10 bbl. in a shallow pay will yield a greater return on the investment than a 500-bbl. well prorated to 30 bbl. in a 5,000-ft. sand. Every small town and village in eastern Oklahoma and southeastern Kansas has one or more men who have earned a very comfortable living by following this type of activity. They may not be "big oil men" and their operations have had to be conducted with the strictest economy but their properties, now fully depreciated, will continue to produce oil for many years and their area will continue to provide much oil for their lifetime and that of their son's and grandchildren.

COMPLETIONS IN ALL FIELDS . . .

(Week Ended May 22, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Pa., and W. Va.	53	14	3	70	140,139	1,229	1,397
Ohio	3	8	5	16	40,612	291	370
Indiana	1	1	5	7	9,195	94	123
Kentucky	1	6	1	8	21,496	123	88
Illinois	17	0	9	26	69,386	672	590
Michigan	4	0	1	5	15,620	161	249
Kansas	16	0	22	38	133,884	567	560
Nebraska	0	0	2	2	4,905	11	18
Missouri, Iowa	0	0	0	0	0	4	9
Oklahoma	11	1	8	20	65,584	417	520
Texas:							
North Central Texas	5	0	16	21	60,244	465	490
West Texas	9	0	6	15	64,343	325	695
Texas Panhandle	1	0	1	2	6,567	66	183
Eastern Texas	4	0	1	5	31,700	97	185
Texas Gulf Coast	1	1	3	5	32,746	148	334
Southwest Texas	6	0	12	18	95,097	324	533
Total Texas	26	1	39	66	290,697	1,225	2,400
North Louisiana	2	1	3	6	19,048	116	194
Louisiana Gulf Coast	7	0	2	9	88,686	126	209
Total Louisiana	9	1	5	15	107,734	242	403
Arkansas	1	0	1	2	15,681	88	59
Mississippi and Southeast	0	0	0	0	0	26	24
Montana	1	2	0	3	3,851	65	59
Wyoming	3	0	1	4	16,390	46	37
Colorado, Utah	0	0	0	0	0	5	4
New Mexico	2	0	1	3	9,042	79	104
California	26	0	8	34	125,585	469	318
Total United States	174	34	111	319	1,069,801	6,014	7,332
Total previous week	202	26	111	339			
Week ended May 23, 1942	197	35	101	333			

ROCKY MOUNTAIN AREA

Tests Planned for Southeast Colorado Area

DENVER, Colo. — The southeastern corner of Colorado, in which there has been comparatively little activity in recent years, came in for attention this week as a result of the completion of a 19,000,000-ft. gas well in the Keyes district, Cimarron County, Oklahoma. Only two deep tests have been drilled in Baca County on the Colorado side. One of these was put down in 1928 by the old Marland Oil Co. on the west side of the county. The other was drilled in 22-34s-42w in 1930 by the A. R. Jones Oil & Operating Co. The latter test had the top of the Mississippian at 4,830 ft. and went to 4,965 ft., but did not test the Wilcox sand. In 1938 the Pure Oil Co. did some core drilling in southern Baca and the Shell Oil Co., Inc., had a magnetometer party in the field. Pure is reported to have a crew in the field at present and to be taking leases.

The well just completed in the Keyes district is Pure 1 Cox, SE SW SE 16-5n-8e. It had the Arkosic sand in the Pennsylvanian at 4,680-4,720 ft., which gaged 19,000,000 cu. ft. under 875 lb. pressure. It was drilled to a total depth of 6,280 ft., where it had water in the Arbuckle. Another test 12 miles south of the Baca County line is being started in J. L. Ryan 1 State, C NE NW 27-5n-5e.

Oil well at Powder Wash. — The Mountain Fuel Supply Co. has deepened its 1 Burton Musser, C NE 5-11n-97w, in the Powder Wash field, Moffat County, northwestern Colorado, from 2,152 ft. to around 5,000 ft. and completed it for 75 bbl. per day. This was the gas discovery well in that field and was completed in the upper Wasatch in 1931 for 34,188,000 cu. ft. Subsequently the company drilled two oil wells to the north and northwest, along with several gas wells. The Musser well, after deepening, was recompleted to produce the gas between the 8⅝ and 5½-in. strings and the oil between the 5½-in. and the tubing. It came in flowing, but the oil congeals upon reaching the surface.

Oregon Basin Madison lime test.— Ohio Oil Co. 2-A Baston, on the south dome of the Oregon Basin field, was reported a completion for 245 bbl. per day from the Embar. The location is ⅛ mile southwest of Yale Petroleum Corp. 4 Hancock, NW NE NE Section 5, a discovery in the Madison 2 months ago at 4,663 ft., which swabbed 1,600 bbl. initial. Top of the Madison was at 3,920 ft. The Ohio 2-A Baston was supposed to be a test to the Madison, but the sand record was not reported. It went to 4,451 ft. and offset on the east 3-A Baston, which had the top of the Tensleep at 3,730 ft.

Pilot Butte extension. — British-American Oil Producing Co. 1-D Tribal, SW NW 15-3n-1w, Pilot Butte field, ¾ mile northwest of the discovery well, is a near completion. It is bottomed at 6,349 ft. and ran 6,242 ft. of 7-in. in the top of the Tensleep. It was intended to perforate and make a test of the Embar before completing in the Tensleep, but casing trouble interfered. On a swabbing test it looks as though it will be about the same as the discovery, which averaged 750 bbl. daily on a 2-day test. It is running a little higher than the discovery.

Geophysical crews. — Fred Goodstein, president of the American Iron & Metals Co., of Casper, following a trip through Montana and Wyoming, reports 20 geophysical crews are now working or getting ready to work in the two states. These include both seismograph and magnetometer surveys. Other sources state that 12 seismograph crews have been located, but did not include those using the magnetometer. Not included in the above are several crews working in northern and southeastern Colorado and northwestern New Mexico. The number would be considerably larger if crews were available. Not only is there a shortage of men on account of the number entering the service, but most of the crews intact have all the work they are capable of performing under contract.

Steamboat Butte location.—British-American has spotted a location for its 2-E Tribal, NE SW NW 5-3n-1w, 1,320 ft. south of its Sundance sand discovery at Steamboat Butte. Acreage north of the discovery is being tested in its 1-C Tribal.

Ingomar test.—Northern Ordnance, Inc., has spotted its 1 California, C SW NE 22-9n-35e, on the Ingomar structure, Rosebud County, Montana, on a farmout from the Carter Oil Co. This makes seven wildcats it is getting under way on Carter blocks in Montana.

Show in Midway test. — R. C. Tarrant 1 Anderson, C NE SE 26-28n-2w, Midway district, Pondera County, Montana, had a show of oil in the Sunburst sand at 1,730-35 ft., and is awaiting pipe before drilling ahead. He will abandon an old well in Cut Bank to obtain casing. Location is about 2 miles northwest of his 1 Wood, which last year had a show of 43-gravity oil in the first 10 ft. of the Sunburst and then ran into water. It bailed 1½ bbl. in 2 hours. The Wood well is to test the Devonian. Considerable leasing has taken place around these operations since last year. Tarrant has a 16,000-acre block jointly with a group of Cut Bank operators.

Continental resumes at McCallum. Continental Oil Co. has resumed work on its 5 Pollock, North McCallum, Jackson County, Colorado, at 4,500 ft., where it was shut down for the winter. This is a test to the Frontier and Dakota in an area where it has several wells which produce very high-gravity crude along with carbon dioxide gas. The latter, if unrestrained, comes from the casinghead at a temperature of 110° below zero.

WYOMING COMPLETIONS

Cole Creek, Natrona County: General Petroleum Corp. 53 Government, NW SW NE 21-35n-77w, T.D. 4,539 ft., 5½-in.

(Continued on Page 114)

DAILY AVERAGE PRODUCTION FOR WEEK

	May 22 crude oil	May PAW quota all oils	May 15 crude oil
Arkansas	72,600	73,000	72,100
California	780,325	822,700	778,500
Colorado	6,700	7,400	6,645
Eastern fields	101,950	115,700	97,200
Illinois	210,500	250,800	236,100
Indiana	13,200	16,000	15,250
Kansas	311,650	309,700	305,550
Louisiana	348,200	359,300	348,050
North Louisiana	*87,200*	.....	*87,000*
Louisiana Gulf Coast	*261,000*	.....	*261,050*
Michigan	57,900	62,100	61,100
Mississippi	56,300	50,000	52,450
Montana	20,275	24,600	19,950
Nebraska	2,100	2,400	2,000
New Mexico	101,000	105,700	103,500
Oklahoma	318,700	379,000	321,300
Texas	1,502,400	1,562,000	1,502,550
East Texas	*339,300*	.....	*339,300*
West Texas	*226,750*	.....	*226,750*
North Central Texas	*131,750*	.....	*131,900*
East Central Texas	*124,300*	.....	*124,300*
Texas Panhandle	*91,100*	.....	*91,100*
Texas Gulf Coast	*513,950*	.....	*513,950*
Southwest Texas	*75,250*	.....	*75,250*
Wyoming	92,900	97,000	91,740
Total United States	3,996,700	4,237,400	4,013,985

Total production Jan. 1-May 22, 1943 ..... 554,236,360 bbl.
Same period last year ..... 541,550,940 bbl

SOUTHWEST TEXAS

New Pools Make Starr County Most Active in Area

CORPUS CHRISTI, Tex.—A spurt in drilling activity in the new Lockhart field and in the pool 3½ miles southeast of it being opened by Baldridge & King's 1 Mary Edgerton and not yet named made central Starr County a point of interest this week. Lockhart & Davenport are rigging up for 2 E. P. Caffarelli, in Porcion 80, 1,000 ft. southeast of 1 Caffarelli, the discovery well. Their 1 First National Bank of Mission, 1,320 ft. south of the discovery and designed to extend the boundary of the pool, was coring at 3,905 ft. at latest report. The hole has tested oil odors. Projected depth is 4,250 ft. Sun Oil Co. has staked location for 1 Marrs McLean, 1,200 ft. northwest of the discovery in the Lockhart field.

Baldridge & King are rigging up 1 Francisco Rodriguez, 7 miles north of Rio Grande City and have staked location for 2, 3, 4 and 5 Rodriguez in the area tapped by 1 Edgerton, Frio sand discovery 12 miles northeast of Rio Grande City. It is understood that all four tests will be started as soon as permission is granted and that they will go to 1,500 ft. The Edgerton, plugged back to 1,227 ft. from total depth of 4,510 ft., was pumping 18 bbl. of oil and 72 bbl. of salt water on a late report. It was still testing.

W. L. Goldston et al 1 Alberto Gutierrez, wildcat test a mile northwest of the Barbacosa field in Starr County, was moving in. Sun 2-A F. Alvarado, 5 miles northeast of the Rincon field, was drilling at 5,530 ft. in shale. Sun Oil Co. 1-B Montalva, a mile southwest of the North Sun field, tested no pressure on a 3-hour drill-stem test through ¼-in. choke, with perforations at 5,915-17 ft. and recovered mud. Operator squeezed all perforations and was waiting for cement to set.

Karnes County.—Transwestern Oil Co. 1 Parr-Sellers wildcat, 6½ miles southeast of Runge, with perforations at 4,122-23 ft., tested 48 bbl. of oil and 1,309,000 cu. ft. of gas through 13/64-in. choke. Tubing pressure was 1,520 lb., casing pressure 1,615 lb., and gas-oil ratio 25,173. W. A. Richardson Drilling Co. 1 Tally, 2 miles south of Robstown, was at 5,009 ft. in shale, with no shows.

La Salle County.—Progress Petroleum Co. 1 Marie Zuehl, wildcat 2½ miles west of the Washburn field, topped the Carizzo at 3,185 ft. and was drilling in shale at 5,425 ft. Tests yielded oil and gas odors. Quintana Petroleum Corp. 1 F. J. Gausemeir, 4 miles south of the Washburn field, topped the massive Carrizo at 3,234 ft. and was drilling in sandy shale at 5,164 ft. Quintana 2-D South Texas Syndicate, 8 miles south of the Washburn field, was at 5,461 ft., without having tested any shows.

Jim Wells County.—Humble 1 M. A. Evetts, 2 miles north of Magnolia City, tested slight oil odor at 5,652 ft. in sand. It was planned to make a drill-stem test following repairs on rig motors.

SOUTH CENTRAL TEXAS COMPLETIONS

Menard County: A. J. Talbot 1 W. J. Wilkerson, dry at 3,612 ft.

LOWER GULF COAST COMPLETIONS

Wildcats

Aransas County: Southern Minerals Corp. 2 Mortgage Land & Investment Co., 3 mi. NW of McCampbell field, dry at 7,512 ft.

Bee County: W. E. Rowe and R. Delange 1 C. Driscoll, 2½ mi. SE of Skidmore, dry at 5,524 ft.

Jim Wells County: Humble 1 San Antonio Stock Land Bank, 1½ mi. NE of Magnolia City, dry at 6,015 ft.

San Patricio County: Coastal Refineries, Inc., and Henshaw Bros. 1 P. Botello, 6 mi. NE of Edroy, dry at 6,507 ft.

John T. O'Neil 1 J. F. Welder, 3 mi. SW of Odem field, 52 bbl. distillate and 2,320,000 cu. ft. gas through ¾-in. choke, with 2,600-lb. working pressure, gas-oil ratio 44,610 perf. 6,842-46 ft., T.D. 7,123 ft., P.B. 6,850 ft.

(Continued on Page 102)

EASTERN TEXAS FIELDS

East Outpost to Turtle Bay Field Flows on Test

DALLAS, Tex.—J. F. Morrissey & Co. 1 Rollins, J. Haynes Survey, Hunt County wildcat, was reported to have flowed a total of 40 bbl. of oil from Woodbine sand to indicate a new pool. Seven-inch casing set at 2,807 ft. was perforated from 2,464-2,716 ft., and the hole was washed with oil. After being shut in, the well flowed 6 bbl. the first hour, 10 bbl. the second hour, and 3 bbl. the third hour. The test is 3 miles northeast of Greenville, 10 miles north of the Weyland Woodbine sand pool, and 3 miles west of the Stanolind Oil & Gas Co. 1 Tilson heirs, Paluxy sand producer now taking potential. Humble Oil & Refining Co. 1 Graham, northwest of the Weyland pool, was drilling at about 7,200 ft. Unconfirmed reports from the field say that good showings were passed up in the Paluxy zone.

Wood County.—First failure for the Quitman field was recorded last week when Amerada Petroleum Corp. and Gulf Oil Corp. 1 S. J. White, in the S. G. Purse Survey, on the east side of the pool, was abandoned at 6,370 ft. after showing for a very small well. A Travis Peak test is to be drilled by Shell Oil Co., Inc., southeast of the new Cartwright pool, discovered by Bobby Manziel 1 Bailey. Shell's test will be on the M. C. Shepard farm in the John Polk Survey. A new attempt to prove the Alba structure will be made by W. W. Hinchcliffe, who has staked location in the Alba townsite in the J. Simpkins Survey.

Franklin County.—L. A. Grelling, Jr., 1 J. P. Stanley, Lake Franklin area, a failure in the Paluxy, was drilling deeper to test the Rodessa and Travis Peak horizons, producing in Tide Water Associated Oil Co. and Seaboard Oil Co. 1 Bacon, Maximillian Survey. Last depth reported was 6,400 ft. Application for dual completion has been filed on the Tide Water and Seaboard discovery. A new test for the area has been staked by the discoverers, 3,050 ft. from the east and 3,600 ft. from the north lines of the Maximillian Survey, to be known as 1 G. L. Gilbert, 1,600 ft. north of the discovery well.

EASTERN TEXAS COMPLETIONS

Fields

Coke, Wood County: Amerada 2 J. D. Kennemer, 735 ft. from N, 467 ft. from W, 98.15 ac. tract, B. Smith Sur., elev. 511 ft., I.P. 96 bbl., Paluxy sand pay 6,333 ft., T.D. 6,361 ft.

Kildare, Cass County: C. C. Gilger 1 Cass County fee, 660 ft. from N, 541 ft. from W, 5,690 ft. from S, J. N. Watson Sur., elev. 297 ft., flow 166 bbl., pay 6,064 ft., T.D. 6,100 ft.

Quitman, Wood County: Amerada Pet. & Gulf 1 S. J. White, 660 ft. from S & W of lease, S. G. Purse Sur., elev. 444 ft., Paluxy sand 6,319 ft., dry, T.D. 6,370 ft.

Shell Oil 1 Blalock-Blalock unit, 2,061 ft. from S, 780 ft. from W, 71.29 ac. tract, S. G. Purse Sur., flow 634 bbl., Paluxy sand 6,246 ft., T.D. 6,455 ft.

Shell Oil 4 J. B. Goldsmith, 1,993 ft. from N, 660 ft. from W, W. W. Lanier Sur., elev. 436 ft., flow 97 bbl., Paluxy sand 6,225 ft., perf. 6,215-48 ft., T.D. 6,414 ft.

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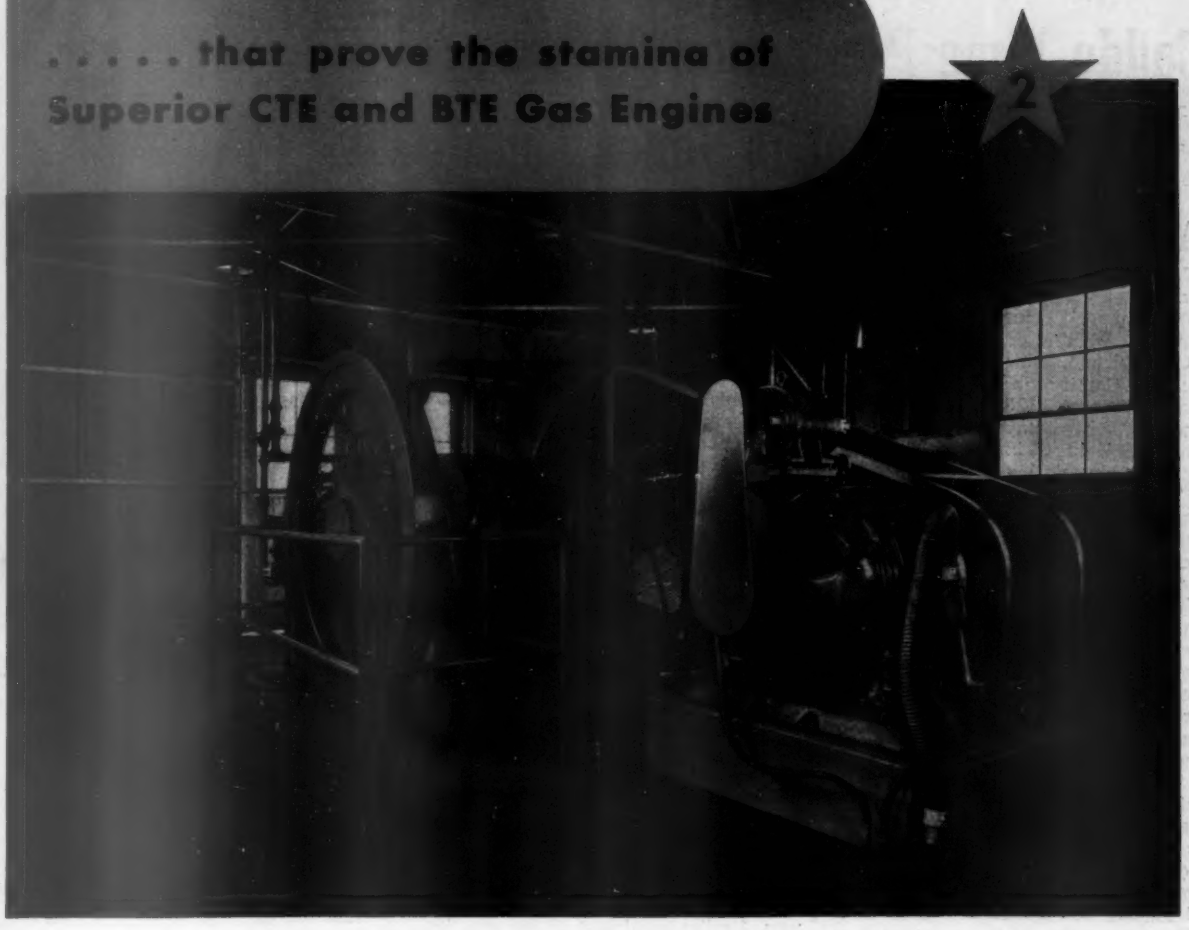

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N. CENTRAL TEXAS

Caddo Lime Production Found in Jones County

ABILENE, Tex.—The most important event in several years for the West Central Texas district is the finding of Caddo lime showing oil in a wildcat well being drilled in Taylor County. Drilling & Exploration Co. 1 D. J. Gibson, Block 8, League 147, Grimes County School Land, topped Caddo lime at 5,135 ft., and had lime showing oil to total depth of 5,152 ft., and set 5½-in. casing at 5,136 ft. after running electric log.

The well, which is 1½ miles southeast of Merkel, is on a southeast trend from the Merkel, Reddin, Wimberly, and Hawley pools, and was temporarily abandoned as dry last November at 3,100 ft. It is understood that several shows were passed up below the Swastika sand to which most of the wells on this trend have been projected, and should this test prove productive, it will stimulate deeper drilling on the known Cisco series structures.

The new potential discovery is 10 miles east of a well drilled on the Taylor-Nolan County line by Hose & Metcalf on the Tipton land in Section 43, Block 19, T.&P. Survey, which was rated good for 74 bbl. from 5,164-71 ft. but was abandoned after three offsets were dry in the same horizon.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Callahan County: E. M. Thomasson 1 S. O. Montgomery, 330 ft. from S, 990 ft. from W, 269 ac. tract, John H. Dickens, dry, T.D. 810 ft.

Coleman County: Sohio Prod. 1 Creswell, NW SE NW Sec. 92, Blk. 2, G.H.&H. Sur., dry, S.S.O. 2,635-37 ft., T.D. 3,258 ft.

Fields

Lee Ray, Eastland County: Lone Star Producing 4 E. J. Ward, 660 ft. from S, 980 ft. from W, Blk. 7, J. B. Hoxie Sur., elev. 1,417 ft., I.P. 43 bbl., pay 3,295 ft., T.D. 3,328 ft.

Poor Farm, Shackelford County: R. H. Roark 4 Shackelford County, SW SE SE Sec. 4, Blind Asylum Land, dry, T.D. 829 ft.

Strawn, Palo Pinto County: Texas Pacific Coal & Oil 3 Fee-Ryan, 1,860 ft. from N, 4,425 ft. from E, Isaac Ryan Sur., junked 3,185 ft.

Strawn Sand Produces in Walnut Bend Outpost

WICHITA FALLS, Tex. — Snuggs, Seitz & McElreath 1 Percy McGeorge, Cooke County wildcat south of the Walnut Bend pool, in Block 64, Fannin County School Land, which last week assured production from the upper Strawn sand at 4,290-4,304 ft., drilled saturated Winger sand from 5,507-12 ft., cored 5,512-21 ft., recovering 9 ft. of sand with good porosity, and was taking drill-stem test. This well is 1 mile south of the new area to the east of the shallower Walnut Bend pool, and will probably be called an extension if it produces from this horizon. Two new producers were being completed on the east side of the pool at Sinclair Prairie 1 Minnie B. Harrison and same company's 1 R. E. Harrison.

Clay County.—Continental Oil Co. 1 T. J. Stephens, 2 miles north of Buffalo Springs, new Mississippi lime pool opener, was shut in for more tankage after flowing 64 bbl. in 4 hours through 1-in. choke, with casing pressure of 1,650 lb. and tubing pressure of 1,225 lb. Pay zone is from 6,011-37 ft. Bridwell Oil Co. staked two new locations on the north edge of the Joy pool after Consolidated Oil Co. 1 Viola C. Meyers, C. Thompson Survey, was completed with a potential of 189 bbl. per hour through ¼-in. choke and then flowed 504 bbl. in the next hour on ½-in. choke.

Jack County.—Standard Oil Co. of Texas and Hanlon-Buchanan, Inc. 1 R. B. Peek, Section 3304, T.E.&L. Survey, 4 miles northeast of Jermyn, indicated a new Caddo lime pool for the county when it topped oil pay at 4,575 ft., cored 4,584-89 ft., recovering 3 ft. of saturated lime, and ran 5½-in. casing, and will drill in with spudder. Youngblood & Foree et al 1 Fulcher, Morrell Survey, wildcat east of Post Oak, was again having trouble when drill pipe stuck at 5,579 ft. in shale.

Young County. — Standard Oil Co. of Texas and Hanlon-Buchanan, Inc., staked a wildcat location to go to 5,000 ft. in Section 738, T.E.&L. Survey, 3 miles south of Proffitt.

NORTH TEXAS COMPLETIONS

Fields

Archer County: W. E. Prod. Co. 4 F. McAnally, Lot 8, G. P. Meade subd., pump 15 bbl., sand pay 1,456 ft., T.D. 1,464 ft.

W. E. Prod. Co. 3 F. McAnally, Lot 8, Meade subd., dry, T.D. 1,502 ft.

Briar Creek, Young County: L. & W. Prod. 1 King & Wooten, 467 ft. from S & E, 132.5 ac. tract, Sec. 1977, T.E.&L. Sur., elev. 1,123 ft., I.P. 92 bbl., 20 per cent water, lime pay 4,174 ft., perf. 4,174-84 ft., T.D. 4,243 ft.

Burns-Browning, Clay County: L. T. Burns 1 Wilson, 660 ft. from N & W, Blk. 36, J. H. Belcher sub., dry, T.D. 5,808.

Buttram, Jack County: Buttram Pet. 7 Cullers-Sporer, SE NW Sec. 2, S.F.I.W. Sur. A-2147, I.P. 19 bbl., sand pay 2,072 ft., T.D. 2,077 ft.

Fargo, Wilbarger County: W. H. Rogers, Jr., 1 D. Green, 440 ft. from N & E Sec. 32, Blk. 15, H.&T.C. Ry. Sur., pump 196 bbl., lime pay 4,513 ft., T.D. 4,593 ft.

Knox, Young County: Harper & Knappenberger 1 W. C. Smith, 1,472 ft. from N, 467 ft. from E, lease, Sec. 3407, T.E.&L. Sur., dry, T.D. 3,618 ft.

Thornberry, Clay County: Johnson & Kouri & Morgan 1 C. T. Taylor est., Sec. 73, Bacon subd., dry, T.D. 1,312 ft.

Wichita County: C. Y. Gorman 1-A W. L. Doyle, George Wheelwright A-320, dry, T.D. 1,210 ft.

Wildcats

Archer County: Avis B. Taylor 1 Mrs. M. A. DeMoss, Blk. 2, C. A. Smith Sur. A-1219, slight showings 1,264-68 and 1,268-69 ft. dry, T.D. 1,284 ft.

Consolidated Oil 1 Frank J. Henry, Lot 36, C.&P. Sur., Blk. 15, dry, T.D. 925 ft.

Jack County: Standard Oil of Texas and Hanlon-Buchanan 1 John W. Carter, Blk. 5, Wm. McDonald Sur., flow 95 bbl., sand pay 2,518-28 ft., P.B. from T.D. 6,040. Discovery.

Hanlon-Buchanan 1-A Dorcas Hensley, 1,485 ft. W, 495 ft. N of NW cor. M. L. Franks Sur. A-1612, but in B. F. Terry Sur., Ellenburger 5,964 ft., dry, T.D. 6,070 ft.

Montague County: Bridwell Oil 1 G. S. Gray, 330 ft. N of Pecan Creek, 330 ft. from W, L. Bennett Sur., dry, T.D. 2,393 ft.

Throckmorton County: Anderson-Prichard 1 Batchler est., 660 ft. from S & E Sec. 1,691 ft., junked hole, T.D. 1,770 ft.

Young County: Dorian & Mitchell 2 C. B. Daniels, 467 ft. from N, 1,449 ft. from W, Sec. 420, T.E.&L. Sur., dry, T.D. 4,525 ft.

Southwest Texas

(Continued from Page 99)

Fields

Hondo Creek, Karnes County: Phillips and Adams Oil & Gas Co. 1 George T. Beaham, Carlos Martinez Sur., A-6, dry at 6,800 ft.

Richard King, Nueces County: Southern Minerals Corp. 5-C Richard King, Agua Dulce grant, 184 bbl. through ⅛-in. choke, T.P. 875 lb., C.P. 1,410 lb., gas-oil ratio 924, perf. 5,562-67 ft., T.D. 5,588 ft.

Seeligson, Jim Wells County: Transwestern Oil Co. 3-B Seeligson estate, H. D. Koopman Sur. 235, 141 bbl. through 3/32-in. choke, T.P. 1,100 lb., C.P. 1,325 lb., gas-oil ratio 690, perf. 6,124-30 ft., T.D. 6,249 ft.

Stratton, Kleberg County: Humble 25 King ranch-Paso Ancho, Santa Gertrudia grant, A-102, 77.9 bbl. through ⅛-in. choke, T.P. 900 lb., gas-oil ratio 1,964, T.D. 6,612 ft.

Stratton, Nueces County: Cox & Hamon 1 Lee Noble, Paso Ancho de Abajo grant, 112 bbl. through 7/64-in. choke, T.P. 1,120 lb., C.P. 1,160 lb., gas-oil ratio 500, T.D. 6,686 ft.

SOUTH TEXAS COMPLETIONS

Wildcats

Duval County: Hamill & Smith 1 J. T. Dinn, 1 mi. W of Kohler field, dry at 3,120 ft. in sidetracked hole.

Quintana 2-B J. F. Welder heirs, 4 mi. W of Fitzsimmons field, dry at 3,997 ft.

Texon Royalty Co. and R. H. Hawn 1 J. Benavides, 2 mi. SE of O'Hern field, dry at 3,510 ft.

Webb County: O. W. Killam 1 A. M. Bruni, 1 mi. N of Holbein field, dry at 4,042 ft.

Fields

Aviator, Webb County: Dulup Oil Co. 5 Puig Bros., Alberca de Arriba grant, dry at 1,835½ ft.

North Sun, Starr County: Sun 1-B C. Laurel, La Sal Colorado grant, A-157, 126 bbl. through 9/64-in. choke, T.P. 760 lb., C.P. 1,200 lb., gas-oil ratio 912, perf. 4,545-48 ft., T.D. 4,557 ft.

Washburn, La Salle County: Quintana 22 South Texas Syndicate, E. M. Dull Sur. 86, A-1371, dry at 5,806 ft.

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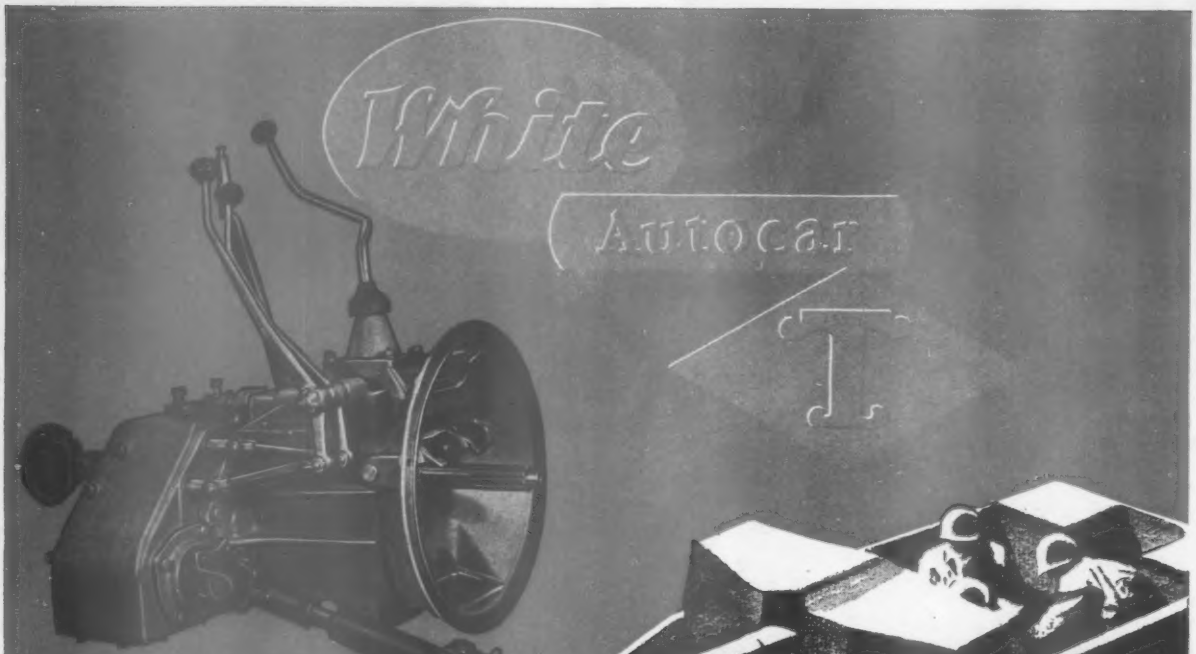

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OKLAHOMA

Wildcats Again Active As Flood Waters Recede

THE recent floods have cut the state's production to a low of several years but late reports indicate a return to normal operations is under way and a number of promising wildcats were active.

Cleveland County.—High water delayed work at Deep Rock Oil Corp. and Selby Oil & Gas Co.'s 1 Harris in NE NW NE 11-10n-1w. Production tests are now under way and late last week the well was flowing 25 bbl. of oil an hour through choke on tubing. Pay zone is the Simpson dolomite at 6,501 ft. The second Wilcox sand was topped at 6,596-6,603 ft., total depth, and casing set at 5,609 ft. Early flowing tests produced up to 75 bbl. of oil and fluid an hour.

Love County.—Mudge Oil Co. 1 Tanner, NE NE SE 6-6s-2e, at the south end of the Overbrook anticline some 3 miles southeast of the Ardmore pool was being cleaned out for testing after heading and flowing oil into the pits. Total depth was 4,510 ft. with perforations in casing at 3,160-3,202 ft.

Pottawatomie County.—Hall-Briscoe 1 Dieker, SW SW 19-9n-2e, was given up as dry after finding several good shows of oil. Total depth was 6,232 ft., plugged back to 6,188 ft. in the second Wilcox. Perforations at 5,431-64 ft. produced 1 bbl. of oil an hour; a 5,000-gal. treatment resulted in swabbing 438 bbl. of fluid in 11 hours of which about half was 28-gravity crude. Additional perforations at 6,461-73 ft. and 6,176-82 ft. produced 1 bbl. of fluid an hour, mostly water.

Stanolind Oil & Gas Co.'s 1 Perkins, a wildcat in SW SW SW 10-8n-3e, 1½ miles south of Brooksville, recovered 2,500 ft. of oil on a drill-stem test in Hunton lime at 4,856-69 ft. The well is located in a seismograph high and was headed for the Wilcox sand. Production at Brooksville is also in the Hunton.

OKLAHOMA COMPLETIONS

Wildcats

Lincoln County: R. H. Lynn 1 Yonts, SW SW SW 8-15n-4e, dry, T.D. 4,280 ft., Prue 3,879 ft., Verdigris 3,974 ft., perf. 3,895-98 ft. and flowed 1 bbl. oil and 3 bbl. water with 3,000,000 cu. ft. gas, perf. 3,889-95 ft., esti. 10 bbl. oil and 10 bbl. water, gas exhausted.

Okfuskee County: J. G. Buell 1 Richardson, SW NW 7-10n-9e, dry, T.D. 4,025 ft., Booch 3,028 ft., Cromwell 3,440 ft., Misener 4,003 ft., Hunton 4,005 ft.

Osage County: Norbla and Sinclair Prairie No. 1, SW SW NW 7-26n-5e, dry, T.D. 3,140 ft., Big lime 2,758 ft., sandy shale and show oil 3,050-60 ft.

Pawnee County, 2 mi. E of E. Watchorn: Watchorn Oil 1 Harmon, NE NW 29-23n-4e, dry, T.D. 4,526 ft., Bartlesville 3,070 ft., Misener 3,924 ft., Wilcox 3,932 ft., second Wilcox 3,995 ft., sand 4,060 ft.

Pontotoc County: Blackwell Oil & Gas 1 Watters, NW NW SE 19-4n-8e, dry, T.D. 2,896 ft., Cromwell 2,800 ft.

Pottawatomie County: Hall-Briscoe 1 Dieker, SW SW 19-9n-2e, dry, T.D. 6,232 ft., Earlsboro 5,335 ft., Hunton 5,446 ft., Viola 5,840 ft., dolomite with show oil 5,940 ft.

Seminole County, discovery of Sylvanian pool: Kerlyn and Continental 1 Scott, NW SW SW 3-10n-7e, flowed 14 bbl., Hunton 4,178-4,200 ft., T.D. 4,510 ft.

Fields

Byars, McClain County: Phillips 2 McAfee, NW SE 21-5n-3e, flowed 188 bbl., Viola 3,480-91 ft.

Phillips 1 Underwood, NE SE 21-5n-3e, flowed 113 bbl., Viola 3,552-63 ft.

Chickasha, Grady County: Tide Water 1 Foreman, SE SW 15-5n-6w, 35,000,000 cu. ft. gas, open flow, sand 4,863-5,233 ft., T.D. 5,520 ft., R.P. 1,685 lb.

Isom Springs, Marshall County: Ross M. Winans 1-A fee, SW NE SW 31-7s-6e, pumped 10 bbl., T.D. 529 ft.

Ross M. Winans 2 fee, SW NE SW 31-7s-6e, pumped 18 bbl., T.D. 536 ft.

Red River Bed, Tillman County: Burke Divide 247 Guthrie, NE SE NE 8-5s-14w, pumped 15 bbl. oil and 65 bbl. water, pay 1,575-1,633 ft., T.D. 2,616 ft.

Stroud, Creek County: J. J. Fleet 1 Keys, NE SW 8-14n-7e, flowed 199 bbl., Prue 2,858-2,900 ft.

Velma, Stephens County: Skelly 19-A Stiefel, SE NE NW 35-1s-5w, pumped 18 bbl., T.D. 930 ft.

Skelly 1 Doak-1, SW NE NW 36-1s-5w, flowed 19 bbl., Hunton 4,266-4,872 ft., T.D. 4,889 ft.

Miscellaneous

Okfuskee County: Texas 2 McKernan, N½ NE SW 15-12n-9e, flowed 17 bbl., Cromwell 3,281-3,310 ft.

Okmulgee County: Sooner Oil & Gas 2 Bovaird, N½ SW SE 21-16n-11e, dry, T.D. 2,218 ft.

Pawnee County: Danciger 1-A Rinehart, NE NE SW 21-20n-7e, pumped 3 bbl., T.D. 2,764 ft.

Seminole County: Monahan and Villines 1 Amason, NE NE 18-6n-6e, dry, T.D. 2,710 ft.

APPALACHIAN FIELDS

Fourth Test Starting on Accident Dome, Maryland

PITTSBURGH, Pa. — On Accident dome, in Garrett County, Maryland, William E. Snee et al started moving in for a new test on the De Leon T. Rush farm about 1,850 ft. south, 60° west, of the original test on the Schartzer (Humberson) farm and 1,980 ft. south and 10° west of the test on the George Georg farm. This makes the fourth test on this structure. The first was completed in the Oriskany sand and the other two were abandoned after markers (Burkett shale) in the lower part of the upper Devonian indicated low structural position. All three appear to have ended on the downthrow side of a fault of considerable thrust.

SOUTHWEST PENNSYLVANIA

Westmoreland County.—On Laurel Ridge in Ligonier Township, New Penn Development Co., William E. Snee et al are drilling at 8,014 ft. in the test on the John and Eleanor Beck farm and in dark shale.

Fayette County.—On Chestnut Ridge in South Union Township, New Penn Development Co., William E. Snee et al are drilling at 8,370 ft. in 2 Indian Creek Coal Co. with the Onondaga lime definitely placed at 8,280 ft.; chert 8,312 ft. So far there has been no showing of gas or water. Peoples Natural Gas Co. is fishing in 1 Walters, carrying about 150,000 cu. ft. of gas from the Onondaga chert beds. In Wharton Township, Greensboro Gas Co. is building the rig for 4 Barton.

Beaver County.—In Ohio Township, Beaver County, South Penn Oil Co. has the rig standing for the test on the Cunningham-Vlatovich unit.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Westmoreland County, Bell Township: Peoples Natural Gas Co. 2 H. C. Hicks Coal Co., drilled deeper, 174,000 cu. ft. gas; Bradford sand 3,267 to 3,312 ft.; gas 3,282-88 ft. and 3,298 to 3,312 ft.; T.D. 3,404 ft.

Upper Burrell Township: Equitable Gas Co. 3291 Thomas Bruno, 58,000 cu. ft. gas; Speechley sand 3,115-67 ft.; gas 3,120 ft.; Tiona 3,225-42 ft. T.D. 3,248 ft.

WEST VIRGINIA

In West Virginia, another Oriskany test proved dry in the southern part of the state and was abandoned, while another reached the Corniferous lime.

COMPLETIONS

Boone County, Peytonia district: United Carbon Co. 7 Siler Coal Land Co., 400,000 cu. ft. gas; Big lime 1,448 ft.; T.D. 1,711 ft.

(Continued on Page 108)

EVER since the discovery of oil, The Petroleum Industry has constantly developed new weapons to conquer the inexorable forces of Nature. New materials . . . new equipment . . . new methods . . . already proved and accepted have prepared it for the present emergency. Whereas other industries have had to re-tool to meet the emergency of war, the Petroleum Industry is ready NOW!

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PERMIAN BASIN, PANHANDLE

Fourth Ellenburger Test Staked in Winkler County

MIDLAND, Tex.—The fourth Ellenburger test was staked in Winkler County last week, the first two having opened new pools, and the third now drilling in fractured dolomite showing oil.

Sinclair Prairie Oil Co. 1 Seth Campbell is 660 ft. from south and west lines of Section 11, Block B-5, Public School Land Survey, 4 miles southeast of Kermit. It is on a line between Shell Oil Co. 1 Sealy-Smith in Ward County and A. G. Carter C-2 Walton in Winkler County, also being 13 miles west of Stanolind Oil & Gas Co. and Shell Oil Co., Inc., 1 Blue which is now promising production while coring ahead. Last core in the Stanolind-Shell test from 10,551-61 ft. recovered 2 ft. of fractured crystalline dolomite with good stain and odor, and the formation appears to be softening somewhat judging from the coring time.

Magnolia Petroleum Co. 20 State-Walton, Section 4, Block B-3, Public School Land, took potential gage of 600.51 bbl. per day, but was shut down when separator was struck by lightning and caught fire. Amon G. Carter C-2 Walton is still trying to get perforations squeezed.

Andrews County.—Water table for the Fullerton pool was established when Fullerton Oil Co. 1-A University, NE NE Section 6, Block 13, University, ½ mile south extension for the field, topped water at 7,280 ft., or minus elevation of 3,937 ft. It was plugged back to 7,240 ft., and at last report was flowing 65 bbl. per hour from two pays in the Clear Fork. Skelly Oil Co. 1-K University, Section 28, Block 9, University, was drilling ahead below 6,900 ft.

Howard County.—The Iatan-East Howard lime pool was extended ½ mile northwest when Sinclair Prairie Oil Co. 1 Emma Davis, Section 44, Block 30-1n, T.&P. Survey, flowed 496 bbl. per day from pay at 2,520-36 ft. W. S. Guthrie 1 Pauline Allen, Section 57, Block 20, Lavaca Navigation Survey, which has been estimated at good for 100 bbl. per day from Clear Fork or Wichita pay in the Permian, had pulled tubing to clean out before making potential test.

Crane County.—Gulf Oil Corp. 1 W. A. Estes, Section 2, Block B-28, Public School Land, pumped 15 bbl. of oil in 10 hours from 3,825-80 ft., assuring a new Holt zone producing area in the western part of the county.

WEST TEXAS COMPLETIONS

Wildcats

Mitchell County: W. E. Casebolt 1 W. B. Smith, NE SW Sec. 64, Blk. 25, T.&P. Sur., dry, T.D. 4,000 ft.

Pecos County: Brown & Hancock 1 W. F. McKay, 660 ft. from N, 3,300 ft. from E, Sec. 32, Blk. 1, I.&G.N. Sur., dry, T.D. 2,425 ft.

Winkler County: Magnolia Pet. 20 State-Walton, NW NW Sec. 4, Blk. B-3, Public School Land, flowed 601 bbl., perf. Ellenburger 10,673-10-705 ft., T.D. 10,774 ft., discovery.

Fields

Barnhart, Reagan County: Amerada Pet. 1-RO University, NW NW Sec. 8, Blk. 48, University Sur., flow 500 bbl., pay 9,000 ft. lime, acid 11,000 gal., T.D. 9,189 ft.

Embar-Ellenburger, Andrews County: Phillips Pet. 38 University, NE SW Sec. 30, Blk. 10, University Sur., elev. 3,255 ft., flow 1,740 bbl., lime pay perf. 7,910-44 ft., T.D. 8,005 ft.

Halley, Winkler County: W. A. Black & Sons 1 S. M. Halley, 330 ft. from N & E Sec. 24, Blk. B-12, P.S.L., elev. 2,751 ft., flow 248 bbl., pay 2,750 ft., shot 160 qt., T.D. 2,871 ft.

Iatan-East Howard, Howard County: Sinclair-Prairie 1 Emma Davis, SW SE SW Sec. 44, Blk. 30-1n, T.&P. Sur., elev. 2,487 ft., flow 496 bbl., pay 2,520 ft., T.D. 2,536 ft. Extension.

Magnolia-Sealy, Ward County: Stanolind Oil & Gas 1-Y University, NE NW Sec. 13, Blk. 16, University Sur., sand 2,445-67 ft., dry, T.D. 2,917 ft.

Means, Andrews County: DeKalb Agricultural Assn. 1 C. A. Shields, 555 ft. from S & W NW Sec. 5, Blk. C-45, P.S.L., elev. 3,167 ft., pump 150 bbl., lime pay 4,400-23 ft., acid 7,000 gal., T.D. 4,570 ft. Extension.

Slaughter, Cochran County: Stanolind Oil & Gas 4-A Dean Unit, 660 ft. from N & W Labor 22, Lge. 93, Mills County School Land, I.P. 87 bbl., lime pay 4,957 ft., shot 230 qt., T.D. 5,070 ft., P.B. to 5,050 ft.

Texas Co. 8-F Mallett, 560 ft. from S & W Labor 15, Lge. 51, Scurry County School Land, elev. 3,637 ft., flow 634 bbl., lime pay 5,010 ft., T.D. 5,052 ft.

Taylor-Link, Pecos County: Dave Breeding 4 University, NW SE Sec. 11, Blk. 16, University Sur., dry, T.D. 1,645 ft.

Wasson, Yoakum County: Bay Pet. 2 Sadie O'Dowd, 440 ft. from S and W, N 120 ac. S½ Sec. 806, Blk. D, J. H. Gibson Sur., elev. 3,522 ft., flow 259 bbl., pay 5,028 ft., T.D. 5,130 ft.

Old Well Drilled Deeper

South Cowden, Ector County: Union Oil 1 Paul Moss, NW NW NE Sec. 42, Blk. 42-2s, T.&P. Sur., I.P. 10 bbl., O.T.D. 4,225 ft., N.T.D. 4,337 ft.

McCamey, Upton County: Humble Oil & Ref. 13-B R. P. Ricker, 330 ft. from NE, 4,595 ft. from SE Sec. 6, Blk. R, E. C. Grooms Sur., elev. 3,126 ft., pump 88 bbl., sand pay 2,650 ft., O.T.D. 6,278 ft., N.T.D. 2,725 ft.

(Continued on Page 108)

TEXAS GULF COAST

East Outpost to Turtle Bay Field Flows on Test

HOUSTON, Tex.—Opening of a new oil pool, or extension of an old one, in Chambers County is indicated by reports tthat the R. J. Ursillo 1 Lotz, a mile east of the Turtle Bay field, is showing for a producer. The well is on a tract of 1,700 acres assembled by Davis Wallace, independent geologist of Houston and president of D. M. Wallace Oil Co. Production tests were to be made this week. Mr. Wallace reported that on a drill-stem test the well flowed at the rate of 20 bbl. an hour from perforations at 6,566-70 ft., with tubing pressure of 575 lb. Tanks and separators were being installed. R. J. Ursillo, heading a group of men who financed the operation, resides in New York. Guy Lombardo, orchestra leader, is one of the group.

Cities Service Oil Co. 1 Witcher, 3 miles northeast of Alief, Harris County, flowed at the rate of 62 bbl. of oil and 24 bbl. of salt water daily through ⅛-in. choke, with perforations at 7,924½-26 ft. Testing was to continue. Plugged-back depth is 7,931 ft. Ludeau Oil Co.'s wildcat, 1 Dr. J. E. Ludeau, 3½ miles north of Houston, in Harris County, was reported shut down after having been partly rigged up.

Montgomery County.—The Conroe field, already the largest in the Gulf Coast territory in point of proven reserves, is to receive a 12,500-ft. test. The field is a prolific producer in the Cockfield. An effort made in 1939 by George Echols and E. I. Thompson to establish Wilcox production yielded only minor shows, and the test was abandoned at about 10,000 ft. The new test, located in the center of the big field, is to be made by Albert Plummer and D. B. McDaniel, Houston independent operators.

Jackson County.—W. Stewart Boyle and Sterling Oil & Refining Co. 1 Levy, which opened the new Sterling field 3½ miles southeast of Ganado, after being drilled to 4,893 ft. In a sidetracked hole, squeezed perforations and drilled out to 4,842 ft. Casing was perforated at 4,820-34 ft. and 2-in. tubing swung at 4,803 ft. The well tested gas, with a show of distillate, through ⅝-in. choke, with tubing pressure of 650 lb. and casing pressure of 1,400 lb. It was shut in. Forrest Development Co. 1 Bennett, 1½ miles northeast of La Salle, was at 5,669 ft. in salt-water sand and reaming, with no shows. Stanolind 1 Four Way ranch, 3½ miles southeast of Maurbro, was at 7,798 ft. in hard sand.

Jefferson County.—Glenn H. McCarthy, Inc., 1 Hebert Trust, at 10,092 ft. in sand, blew out last week. At latest report it was blowing gas, sand, and mud, with a slight show of distillate or oil. Efforts were being made to get the well under control. Sun Oil Co. 1 Wilson-Bordages, 3 miles north of Beaumont, was drilling at 6,668 ft. in hard sand.

Matagorda County.—Superior Oil Co. 1 Peterson, Sugar Valley prospect, was at 11,497 ft. in hard shale. It ran an electric survey to 11,276 ft. and was preparing to drill ahead. Brewster & Bartle Drilling Co. 1 Fuller-Nelson, near Chalmers, was drilling at 8,204 ft. in shale.

Wharton County.—Sam G. Harrison et al 1 Wallace & Hancock, 2 miles south of Hilje, is a new wildcat location.

TEXAS GULF COAST COMPLETIONS

Wildcats

Jackson County: J. B. Coffee et al 1 J. L. York estate, 3 mi. SE of Ganado, location abandoned.

Fort Bend County: Stanolind 1 Louise Richter, 3 mi. NW of Beasley, dry at 5,900 ft.

Fields

Buckeye, Matagorda County: United North & South Development Co. 9 C. G. Stoddard, G.B.M. Cotton Sur., dry at 9,311 ft.

Danbury, Brazoria County: Rowan Drilling Co. 20 T. Jamison, H. Austin Sur., 60.67 bbl. on gas lift through 1-in. choke, T.P. 0 to 80 lb., C.P. 325 lb., perf. 4,175-85 ft., T.D. 6,066 ft., P.B. 4,186 ft.

North La Ward, Jackson County: Stanolind 3 Louise Bonnot, A. M. Clare Sur., A-12, 30,000,000 cu. ft. open flow, perf. 5,204-16 ft., T.D. 5,704 ft., P.B. 5,237 ft.

West Mauritz, Jackson County: W. Stewart Boyle et al 1 Stovall-Mauritz, M.&C. Sur., A-237, dry at 5,765 ft.

LOUISIANA GULF COAST

Deep Test Planned for Bayou Couba Structure

NEW ORLEANS, La. — New pay zones will be sought by Gulf Refining Co. in the Bayou Couba field, St. Charles Parish, where it has staked location for a 12,000-ft. test, the 10 Delta Securities Co., in 18-15s-22e. Gulf has established production in the 6,500-ft. levels of this area.

Acadia Parish.—Union Sulphur Co. 2 J. P. Gueno, drilled originally as a relief well for its sister wildcat, 1 Gueno, which blew out, has been temporarily abandoned at plugged-back depth of 10,160 ft. The operations are in the Branch area. Tests are reported to show that 1 Gueno, which for months has been undergoing a recompletion job, will be good for about 97 bbl. of distillate daily through ⅛-in. choke, from pay at 10,453-57 ft. Sun Oil Co. and Standard Oil Co. of Ohio 1 Daily, 1¼ miles southeast of Egan, flowed 25.6 bbl. of distillate through ⅛-in. choke from perforations at 10,610-25 ft. Tubing pressure was 3,580 lb., casing pressure 1,790 lb. (packer leaking), and gas-oil ratio 40,000. Gas volume was 1,200,000 cu. ft. Preparations were being made to plug back and presumably to test another sand section.

St. Mary Parish.—New production is being opened a mile north of the Jeannerette pool by Atlantic Refining Co. 1 Adeline Sugar Factory, Inc., which is reported to have flowed 35-gravity oil at the rate of 145 bbl. daily through ⅛-in. choke from perforations at 10,455-60 ft. on a drill-stem test. Working pressure was 2,000 lb. Texas Co. 4 State-Cote Blanche Island, Bay-15s-7e, was drilling in hard sandy lime at 8,452 ft.

Terrebonne Parish.—Humble Oil & Refining Co. C-1 Continental Land & Fur Co. is a new wildcat location 4 miles south of the Gibson field. Projected depth is 12,000 ft.

Calcasieu Parish.—Union Oil Co. of California has brought in another good producer in the Vinton field, its 8-G Gray, flowing approximately 165 bbl. daily through ⅛-in. choke, from perforations in the 5,700-ft. sand. This company has staked a wildcat, 1 Starke & Brown, in 26-11s-12w, It is Union Sulphur's second test in the Gum Cove area.

LOUISIANA GULF COAST COMPLETIONS

Fields

Avery Island, Iberia Parish: Humble 4 Petit Anse Co., 25-13s-5e, 186 bbl. through ⅛-in. choke, T.P. 1,350 lb., gas-oil ratio 557, perf. 9,000-3 ft., T.D. 9,050 ft., P.B. 9,033 ft.

Bay de Chine, Jefferson Parish: Texas A-4 La Fourche Basin Levee District, 34-19s-23e, dry 9,701 ft.

East Hackberry, Cameron Parish: Texas 34-B State-East Hackberry, Lake-12s-

(Continued on Page 110)

Hamilton and Jefferson Counties Have New Pools

MATTOON, Ill.—Two new productive spots were discovered in the past week in review, one in 36-6s-4e, Franklin County, producing from Aux Vases sand, the other in 23-5s-6e, Hamilton County, producing from lower O'Hara lime.

Seventeen oil wells were completed during the week and nine dry holes.

High water, the overflow from rivers and creeks retarded development work, and only 19 new operations were announced, of which 6 were wildcats, including Pure Oil Co. 1 H. Porter, C NW SW 23-1s-7e, Wayne County; Minerva Oil 1 Parker, C W½ NW NW 19-1s-4e, Jefferson County; Wiser Oil Co. 1 Wessell, NE NW SW 22-1n-2w, Clinton County; Nash Redwine 1-A Old Ben Coal Co., SW NE SW 6-8s-3e, Williamson County; A. H. Anderson 1 White, County Farm, SE NE SW 7-5s-10e, White County; Magnolia Petroleum Co. 1 M. Logan A, SW SW SE 1-9s-10e, Gallatin County.

ILLINOIS COMPLETIONS

Wildcats

Clay County: C. E. Stout et al 1 Pulliam, NE cor. 1-5n-7e, dry at 3,039 ft.

Hamilton County: Fred Phillips 1 Mead, SE SE NW 23-5s-6e, pumped 143 bbl. oil and 37 bbl. water from lower O'Hara lime at 3,206-14 ft., acidized, T.D. 3,222 ft. Pool opener.

Franklin County: Lario 1 Franklin County Mining Co., SW SW NW 36-6s-4e, pumped 46 bbl. oil and 10 bbl. water from Aux Vases sand shot at 3,122-50 ft., T.D. 3,156 ft. Pool opener.

Gallatin County: Robinson & Puckett 1 Smith, C N½ NE SE 29-8s-9e, dry at 3,050 ft., Ste. Genevieve at 2,877 ft., St. Louis at 3,044 ft.

Jefferson County: Deep Rock 1 Iva Cox, SE NW NE 36-4s-3e, dry at 3,238 ft., Tar Springs 2,406 ft., upper Glen Dean 2,470 ft., lower Glen Dean 2,502 ft., Golconda 2,601 ft., Barlow 2,734 ft., Cypress 2,747 ft., Weiler 2,770 ft., Paint Creek lime 2,836 ft., Ste. Genevieve 3,049 ft., McClosky 3,116-26 ft. and 3,132-54 ft., St. Louis 3,231 ft.

Washington County: A. W. Gerson 1 Casten, SE NW SW 9-1s-1w, dry at 1,562 ft., upper Glen Dean 1,184 ft., Golconda 1,268 ft., Barlow 1,345 ft., Cypress 1,367 ft., Benoist 1,554-62 ft.

Wells County: Brown & Fitte 1 Gardner, SE SE SW 21-3Sn-9e, dry at 900 ft.

White County: Kingwood 1 E. L. Spence, NW cor. SE NE NW 33-6s-8e, dry at 3,180 ft., Cypress sand 2,732-44 ft., lower O'Hara 3,030-36 ft. Several levels were tested.

Fields

Aden, N, Clay County: Pure 1 S. B. Garrison B, NE NW SE 35-2n-7e, pumped 33 bbl., Aux Vases sand top 2,921 ft., T.D. 2,950 ft.

Allendale, Lawrence County: Ryan Oil 2 Smith-Hershey, NW SE SW 27-2n-2w, pumped 68 bbl., pay 1,439-99 ft., T.D.

Bible Grove, Clay County: Pure 4 A. H. Kluth, SE NE SE 4-5n-7e, pumped 19 bbl. McClosky lime, 2,829-32 ft., T.D. 2,838 ft.

Bridgeport, Lawrence County: E. Geick 3-A Guthridge, NE SW NW 29-3n-12w, pumped 62 bbl., sand at 1,937-58 ft., T.D. 1,961 ft.

Calvin, N, White County: N. V. Duncan 3 H. L. Hon, SE NE NW 6-4s-14w, pumped 134 bbl., Penn. sand, 1,503-53 ft., sand at 1,568-1,605 ft., T.D. 1,609 ft.

Covington, Wayne County: Deep Rock 1 Stroup, C NW SW 29-1s-7e, pumped 280 bbl., lower O'Hara at 3,184-93 ft., acidized, T.D. 3,195 ft.

Dale, Hamilton County: Shell 4 G. W. Morris, SE NW SE 18-6s-7e, old well P.B. from 3,059 ft. to Weiler sand at 2,707-37 ft. and shot. Pumped 93 bbl.

Friendsville, Wabash County: Magnolia 1 Hallock estate, NE NE NW 34-1n-13w, pumped 86 bbl., lower O'Hara top 2,647 ft., T.D. 2,768 ft., and P.B. to 2,742 ft.

Inman, W, Gallatin County: Globe Oil and B. Martin 1 Straub, pumped 19 bbl. oil, 13 bbl. water, Cypress sand at 2,493-2,502 ft., shot, McClosky lime 2,879-90 ft., T.D. 2,928 ft.

R. B. Martin 2 Bohl, NW SE NW 15-8s-9e, pumped 9 bbl., sand at 2,525-44 ft., shot, T.D. 2,544 ft.

Iola, Clay County: Tide Water 10 C. B. Doris, C SE NE 15-5n-5e, pumped 66 bbl. oil, 16 bbl. water, McClosky lime 2,419 to 2,974 ft. in streaks, acidized, T.D. 2,482 ft.

Luttrell et al 9 Reid heirs, NW SW NW 14-5n-5e, pumped 480 bbl. oil, 10 bbl. water, Benoist sand 2,289-2,404 ft., Aux Vases sand 2,323-66 ft., T.D., shot at 2,338-66 ft., pipe perforated at 2,263-2,323 ft., T.D. 2,366 ft.

Luttrell et al 3 Reid heirs, SW NE NE 15-5n-5e, pumped 125 bbl. oil, shot at 2,345-73 ft., T.D., old well deepened from 2,321 ft.

Central Pipe Line 1 Reid, NW NW NW 14-5n-5e, pumped 75 bbl. oil, 130 bbl. water, Aux Vases sand topped at 2,358 ft., T.D. 2,370 ft., P.B. to 2,361 ft.

King, Jefferson County: Texas 1 H. V. Smith Community, SW NW NW 34-3s-3e, pumped 37 bbl. oil, 47 bbl. water, Aux Vases sand at 2,738-53 ft., shot twice, McClosky lime 2,840-50 ft., T.D. 2,850 ft.

Nash Redwine 1 Charles Martz, SW NW SE 34-3s-3e, dry at 2,770 ft., Menard 2,009 ft., Vienna 2,130 ft., Tar Springs 2,135 ft., upper Glen Dean 2,229 ft., lower Glen Dean 2,249 ft., Golconda 2,346 ft., Barlow 2,458 ft., Cypress 2,491 ft., Paint Creek, 2,555 ft., Renault 2,721 ft., Aux Vases 2,740-46 ft.

Phillipstown, White County: Jarvis & Marcell 9 H. J. Garner, SE NE NW 31-4s-11e, swabbed 48 bbl., Penn. sand 1,467-78 ft., T.D.

Rural Hill, Hamilton County: Edson Oil 1 P. Culpepper, NE NE NW 25-6s-5e, pumped 52 bbl. oil, 40 bbl. water, McClosky lime acidized at 3,190-3,260 ft., T.D. 3,290 ft.

Sailor Springs, S, Clay County: McBride, Inc. 1 Cailteux, SE SW SE 3-3n-7e, dry at 3,022 ft.

Sims, N, Wayne County: Pure 1 Fred Manahan, SW NE NE 17-1s-6e, dry at 3,062 ft., Aux Vases sand top 3,017 ft.

Stokes, White County: Carter Oil 2 Ora Phillips, SE NW NE 19-6s-9e, pumped 71 bbl., shot at 2,680-84 ft. and 2,822-26 ft., P.B. to 2,428 ft. and casing perforated at 2,342-43 ft. and 2,314-15 ft., T.D. 2,957 ft.

Appalachian

(Continued from Page 105)

Scott district: United Fuel Gas Co. 5203 Horse Creek C. & L. Co., 198,000 cu. ft. gas; Big lime 1,282 ft.; Big Injun 1,496; Berea 1,972; brown shale 3,228; T.D. 3,606 ft.

Washington district: Hope Natural Gas Co. 8635 Stacy S. Miller, 78,100 cu. ft. gas; Big lime 1,293 ft.; Big Injun 1,514 ft.; Berea 2,023; T.D. 2,085 ft.

Braxton County, Otter district: Pittsburgh & West Virginia Gas Co. 7884 G. W. Howell & Brannon, 113,000 cu. ft. gas, Big Injun, T.D. 2,260 ft.

Salt Lick district: West Virginia Gas Corp. 1 J. C. Gillespie, dry, through Injun sand, T.D. 2,394 ft.

Calhoun County, Sherman district: Hope Natural Gas Co. 8637 S. A. McCartney, 179,000 cu. ft.; gas, Salt sand, T.D. 1,750 ft.

Clay County, Pleasant district: E. L. and C. G. Osborne 1 Betty Mullins, 33,000 cu. ft. gas, Injun sand, T.D. 2,202 ft.

Kanawha County, Union district: Pure Oil Co. 1 D. M. Casdorph, 77,000 cu. ft. gas, Big lime, T.D. 1,600 ft., may acidize.

Godfrey L. Cabot, In. 1089 George W. Goff heirs, dry, Big lime 1,4951 to 1,633 ft.; Big Injun 1,633 to 1,709 ft.; water 1,700 ft.; T.D. 1,740 ft.

Lincoln County, Washington district: United Carbon Co. 7 Lincoln Mineral Co., 607,000 cu. ft. gas; Big lime 1,520 ft.; Injun 1,690 ft.; Berea 2,160 ft.; brown shale 3,368 ft.; T.D. 3,819 ft.

McDowell County, Browns Creek district: Godfrey L. Cabot, Inc. 1069 John Gilbert, dry, through Oriskany sand, 6,269-81 ft.; T.D. 6,533 ft.

Ritchie County, Clay district: Pleasants County Bank et al 2 G. A. Riggs, 50 bbl., Maxton sand, T.D. 1,605 ft.

Murphy district: W. H. Mossor 1 Tessie B. Byrd, 68,000 cu. ft. gas, Big Injun sand, T.D. 1,917 ft.

Wirt County, Clay district: W. C. Patterson 7 fee, 4 bbl., Cow Run, T.D. 510 ft.

ORISKANY GAS FIELDS

Jackson County, Ripley district: West Virginia Gas Corp. 1 W. G. Starcher, 1,726,000 cu. ft. gas, Corniferous lime 5,029 ft.; Oriskany 5,119 ft.; R.P. 960 lb., 6 hr.; T.D. 5,137 ft.

West Virginia Gas Corp. 1 Ray Painter, 327,000 cu. ft. gas after shot; Corniferous lime 4,990 ft.; Oriskany 5,091-5,133 ft.; gas 5,097-98 ft.; R.P. 920 lb., 19 hr.; T.D. 5,171 ft.

Washington district: Columbian Carbon Co. 706 V. L. Southall, 327,000 cu. ft.; Corniferous lime 5,078 ft.; Oriskany 5,184-5,228 ft.; sand 5,236-54 ft.; shot 5,186-5,227 ft.; T.D. 5,297 ft.

Permian Basin, Panhandle

(Continued from Page 106)

SE NEW MEXICO COMPLETIONS

Wildcat

Eddy County: S. P. Yates & Herbert Aid 1 Leonard-State, NE NE 16-17s-29e, dry, T.D. 2,770 ft.

Fields

Leonard, Eddy County: Grayburg Oil 1-B Keely, NW NE NE 26-17s-29e, flow 390 bbl., lime pay 2,795 ft., acid 6,500 gal., T.D. 2,918 ft.

Square Lake, Eddy County: Texas Trading Co. 2 C. W. Grier, SE SW 29-16s-31e, flow 250 bbl., pay 3,258 ft., shot 70 qt., T.D. 3,354 ft.

TEXAS PANHANDLE OPERATIONS

Hutchinson County: Sinclair-Prairie Oil 16 Maggie Weatherly, 1,980 ft. from S, 510 ft. from W, Sec. 23, Blk. Y, A.&B. Sur., elev. 3,098 ft., I.P. 97 bbl., pay 3,023 ft., T.D. 3,088 ft.

Skelly Oil 1 N. A. Stevenson, Sec. 8, Blk. M-24, T.C.R.R. Sur., dry, T.D. 3,479 ft.

OHIO, KENTUCKY

Killbuck Gas Field Extended to South

ZANESVILLE, Ohio.—The Kemrow Co. extended the Killbuck pool a location to the south by completion of the 1 W. Anderson, Section 9, Killbuck Township, Holmes County, Ohio. The Clinton sand was found at 3,441-78 ft. and gaged 3,500,000 cu. ft. with 1,050 lb. rock pressure.

The Symmes pool in Lawrence County was extended ½ mile to the west by the Ohio Fuel Gas Co. 5 D. A. Moulton.

Ohio Oil Co. will plug its wildcat at Cambridge in Guernsey County. The well was shot but no increase in gas resulted.

OHIO COMPLETIONS

Athens County, Carthage Township: Porter et al 16 F. W. Chapman, Fr. 25, Maxon, 15,000 cu. ft., T.D. 998 ft.

Guernsey County, Richland Township: R. M. Burns 8 M. W. C. D. L-13, shale, dry, T.D. 480 ft.

Holmes County, Killbuck Township: Kemrow 1 W. M. Anderson, Sec. 9, Clinton, 3,500,000 cu. ft., T.D. 3,479 ft.

Lawrence County, Symmes Township: Ohio Fuel 5 D. A. Moulton, Sec. 30, Clinton, 824,000 cu. ft., T.D. 3,103 ft.

Morgan County, Marion Township: Bern O. & G. 11 S. H. Schofield, Sec. 2, Salt sand, dry, T.D. 884 ft.

York Township: Pure Oil 4 C. C. Williams, Sec. 26, Clinton, 1,500,000 cu. ft., T.D. 4,314 ft.

Muskingum County, Hopewell Township: Atha 1 Verner Watts, Sec. 2, Clinton, 157,000 cu. ft. and 12 bbl., T.D. 3,418 ft.

Noble County, Enoch Township: H. G. Clymer 8 John Huffman, Sec. 16, Berea, 133,000 cu. ft., T.D. 1,812 ft.

Patten et al 2 Andrew Estadt, Sec. 19, Berea, dry, T.D. 1,640 ft.

Perry County, Clayton Township: Prestor Oil 2 Alfred Humphrey, Sec. 4, Clinton, 102 bbl., T.D. 3,397 ft.

Pure Oil 3 J. W. Ford, Sec. 6, Clinton, 88 bbl., T.D. 3,252 ft.

Coal Township: Preston Oil 223 Sunday C. C. Co., Sec. 36, Clinton, dry, T.D. 3,790 ft.

Reading Township: Industrial Gas 1 Katherine Leibig, Sec. 22, Clinton, dry, T.D. 3,028 ft.

Stark County, Pike Township: Nat. Gas W. Va. 1 John Welter, Sec. 15, Clinton, 1,247,000 cu. ft., T.D. 4,798 ft.

Washington County, Independence Township: Patterson 11 David Worstell, Sec. 18, Injun, 1 bbl., T.D. 1,450 ft.

Wesley Township: Orndoff 6 H. L. Rudolph, Sec. 5, Macksburg 800, 250,000 cu. ft., T.D. 890 ft.

EASTERN KENTUCKY

Ashland, Ky.—One oil well and six gas wells were reported completed in eastern Kentucky last week contributing to a midmonth indication of a slight increase in drilling activities. Weather has slowed road building in some fields but the general tend is improved.

EASTERN KENTUCKY COMPLETIONS

Wolf Creek, Martin County: Diedrich & Hale 3 Cassidy heirs, T.D. 1,397 ft., 12 bbl.

Beaver Creek (left branch), Floyd County: Kentucky-West Virginia Gas 5437 T. J. Little, T.D. 3,061 ft., in shale, 119,000 cu. ft. gas, open flow.

Jones & Lindsey 1 Bill Burchett, O.W. D.D., 119,000 cu. ft. gas, open flow.

Warfield Gas Co. 5141 Elk Horn Coal, Blk. 197, T.D. 2,876 ft., shale, 133,000 cu. ft. gas.

Island Creek, Pike County: United Carbon 38-1108 Colony Coal, 823,000 cu. ft. gas, in Big lime, T.D. not available.

E. C. Ware 1 on James Sword, T.D. 3,142 ft., 103,000 cu. ft. gas.

Pond Creek, Pike County: Hamilton Co. H-6 Jeff Smith, Tract 1, dry, T.D. 3,163 ft.

Greasy Creek: United Carbon 13-1110 Republican Steel, T.D. 3,625 ft., shale, 133,000 cu. ft. of gas.

Paint Creek, Johnson County: Reed et al Smith Blevins, completed, 1,532 ft.

INDIANA COMPLETIONS

Harrison County: Harrison Development 1 L. Gleitz, SW SW NE 5-3s-4e, 50,000 cu. ft. gas, New Albany sand top 739 ft., T.D. 830 ft.

Gibson County: Continental 59 A. Maier, NE NE NE 14-3s-14w, 4 bbl. per hour, Cypress sand 2,477-97 ft., T.D.

L. L. Travis 1 Hedges, SE SW NW 35-3s-9w, dry at 1,116 ft.

Scott County: E. T. Hart 1 Hammond, NW NW NE 35-4n-7e, dry at 1,552 ft., Devonian lime 103 ft., Trenton 1,060 ft., St. Peter 1,547 ft.

Jasper County: W. D. Farley 1 F. Fenwick, NE NW SW 29-28n-7w, hole full of water at 400 ft.

Lake County: Krien & Dikeman 1 John Brown, NE NE NE 22-32n-8w, dry at 400 ft.

Knox County: Sun 1 H. Weaver, NE SE NW 5-5n-7w, dry at 2,400 ft., Ste. Genevieve 922 ft., St. Louis 1,060 ft., Devonian 2,325 ft.

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Wildcat Is Dry in Extreme Western Kansas

IN Wallace County, near the state line, Broderick & Gordon 1 Goodrich, NE NE 9-14-42w, was dry at 5,663 ft., total depth. Some oil shows were found and hopes were high for commercial production. Formation tops were the Permian at 2,310 ft., Cimarron anhydrite 2,860 ft., Tarkio sand 4,020 ft., Lansing 4,635 ft., Mississippi lime 5,106 ft., Viola lime 5,590 ft., Simpson sand 5,611 ft. and the Arbuckle at 5,615 ft.

The Arbuckle lime was dry and the well was plugged back to the Lansing, perforated and acidized with no results. With plug set at 4,772 ft., perforations made at 4,759-71 ft. and operators bailed 5 to 8 gal. of water in 2 hours with a small amount of heavy black oil. However, the oil was soon exhausted.

Pratt County.—Three wells drawing the maximum potential were completed in the Carmi and North Iuka area. Champlin Refining Co. 2 Steuder, SW NE SW 29-26-12w, made an actual flowing test of 150 bbl. in 6 hours. Pay is the Arbuckle at 4,290-4,308 ft. This field, as well as the main Iuka pool, has expanded rapidly since the first of the year. Production from the Iuka and North Iuka pools jumped from 5,000 bbl. in January to more than 20,000 in March. None of the three pools has been defined in extent and the intervening area presents a large field for further drilling. Production in the Iuka pool is from the Simpson dolomite while the area to the north is entirely Arbuckle.

KANSAS COMPLETIONS

Wildcats

Butler County: Vickers and Phil-Han 1 Weibe, NW NE 10-24-3w, dry, T.D. 3,080 ft., Mississippi lime 2,600 ft., Viola 2,873 ft., Simpson 2,977 ft., Arbuckle 3,053 ft.

Edwards County: Eason Oil 1 Ploger, NW NW SW 9-23-19w, dry, T.D. 5,028 ft., Lansing 3,946 ft., Viola 4,775 ft., Simpson 4,780 ft., Arbuckle 4,929 ft.

Broderick & Gordon 1 Wolfe, SE SE 11-24-18w, dry, T.D. 4,860 ft., Lansing 3,930 ft., Viola 4,640 ft., Simpson 4,752 ft., Arbuckle 4,813 ft.

Graham County: Nadel & Gusman 1 Pennington, NE NE NW 34-6-21w, dry, T.D. 3,863 ft., Lansing 3,516 ft., Arbuckle 3,812 ft.

McPherson County: Olson Drlg. 1 Janssen, SE SW 6-20-3w, dry, T.D. 3,857 ft., Viola 3,713 ft., Simpson 3,761 ft., Arbuckle 3,828 ft.

Rice County: Three-Way Drilling 1 Musenberg, NE NE NW 17-19-10w, dry, T.D. 3,388 ft., Lansing 3,020 ft., conglomerate 3,310 ft., Arbuckle 3,357 ft.

Rooks County: Broderick & Gordon 1 N. Kollman, S½ SE NW 29-8-16w, dry, T.D. 3,485 ft., Lansing 3,120 ft., Arbuckle 3,451 ft.

Russell County: Falcon-Seaboard 1 Heinze, SW SW SW 20-14-11w, dry, T.D. 3,217 ft., Lansing 2,810 ft., Arbuckle 3,185 ft.

Northern Ordnance 1 Beverly, SW NW 11-11-14w, dry, T.D. 3,738 ft., Lansing 3,060 ft., Sooy 3,465 ft., Mississippi lime 3,525 ft., Simpson shale 3,640 ft., Arbuckle 3,683 ft.

Northern Ordnance 1 Roda, NW NW 3-12-14w, dry, T.D. 3,525 ft., Lansing 2,981 ft., Viola 3,421 ft., Simpson 3,445 ft., Arbuckle 3,467 ft.

Stafford County: Stanolind 1-A Hart, NE NE 28-25-15w, dry, T.D. 4,570 ft., Lansing 3,808 ft., Viola 4,378 ft., Simpson 4,473 ft., Arbuckle 4,539 ft.

Wallace County: Broderick & Gordon 1 Goodrich, NE NE 9-14-42w, dry, T.D. 5,663 ft., Permian 2,310 ft., Cimarron anhydrite 2,860 ft., Tarkio sand 4,020 ft., Lansing 4,635 ft., sand 5,032 ft., Mississippi lime 5,106 ft., Viola 5,590 ft., Simpson sand 5,611 ft., Arbuckle 5,615 ft.

Fields

Carmi, Pratt County: Shell 2 Miskemen, SW NE NE 32-26-12w, 3,000 bbl., Arbuckle 4,255-4,301 ft.

Champlin Oil & Ref. 2 Stueder, SW NE SW 29-26-12w, flowed 150 bbl. in 6 hr., Arbuckle 4,290-4,308 ft.

Drach, Stafford County: Phillips Pet. 1 Hitz, SE NW 7-22-12w, pumped 198 bbl. in 11½ hr., Arbuckle 3,672-89 ft.

Driscoll, Russell County: Frontier Fuel Oil 1 Harrington, NE NE 25-15-12w, dry, T.D. 3,331 ft., Arbuckle 3,305 ft.

Eldorado, Butler County: T. S. Dustin 2 Robinson, S½ SE SW 17-25-5e, pumped 20 bbl., Mississippi lime 2,504-50 ft.

Forest Hill, Russell County: Lauck & Moncrief and Sunray 1 Weber, N½ SW NW 28-15-12w, dry, T.D. 3,352 ft., Arbuckle 3,327 ft.

Eldorado Refinery 2 Steinlie, N½ SE NE 29-15-12w, pumped 342 bbl., Arbuckle 3,336-46 ft., T.D. 3,365 ft.

Greenvale, Russell County: Stanolind & Major, S½ NE NE 4-15-12w, pumped 450 bbl., Lansing 2,919-32 ft., 2,993-3,003 ft., T.D. 3,210 ft.

Henderson, Cowley County: Earl Wakefield 2 Campbell, E½ NW SE 22-32-3e, pumped 30 bbl., Layton 2,590-2,600 ft.

Iuka N, Pratt County: Hollow Drlg. 2 Harrel, SW NE NE 36-26-13w, 3,000 bbl., Arbuckle 4,307-29 ft.

Kraft-Prusa, Barton County: Bradley and Marylyn 2 Dolecheck, NE SE NE 13-16-12w, dry, T.D. 3,370 ft., Lansing 3,026 ft.

Sinclair Prairie 7-A Seyfert, NE SW NE 29-16-11w, pumped 82 bbl., Arbuckle 3,306-14 ft.

Black-Marshall 2 Hitschman, NE SW SW 32-16-11w, dry, T.D. 3,437 ft., Arbuckle 3,428 ft.

Phil-Han 2 Kirmer, NE NE NW 8-17-11w, dry, T.D. 3,366 ft., Arbuckle 3,357 ft.

Laton, Rooks County: Cities Service 1 Hodson, S½ SE NW 34-8-16w, pumped 218 bbl., Lansing 3,074-3,101 ft.

Lindsborg, McPherson County: Auto-Ordnance 7 Bengstrom, W½ SE SE 25-17-4w, pumped 75 bbl., Viola 3,377-88 ft., T.D. 3,398 ft.

Lost Spring, Marion County: A.M.F.A. Oil Co. 1 Dunlap, W½ SW SE 23-17-4e, pumped 288 bbl., Mississippi chat 2,331-78 ft.

Otis, Rush County: Morgan-Flynn-Cobb 4 Schroeder, NE SE 23-18-16w, pumped 138 bbl., Lamotte sand 3,535-58 ft.

Pixlee, Chase County: John W. Davisson 1-A Evans, SE NE NE 12-22-9e, dry, T.D. 2,455 ft., Mississippi lime 2,396 ft.

Quincy, Greenwood County: Bisagno et al 1 Steckel, N½ NW NW 6-25-13e, dry, T.D. 1,759 ft.

North Russell, Russell County: Aylward Prod. 1 Ehrlich, NW SW 15-13-14w, dry, T.D. 3,305 ft., Arbuckle 3,282 ft.

Silica, Barton County: J. H. Hershey 3 Roth, N½ SW NE 25-19-11w, pumped 432 bbl., Arbuckle 3,305-27 ft.

C. E. Ach 3-A Schartz, E½ SE NW 7-20-11w, pumped 62 bbl., Arbuckle 3,325-35 ft.

Smith, Cowley County: Sunray 1 West, NW NE SE 15-31-3e, dry, T.D. 3,421 ft., Arbuckle 3,405 ft.

Trapp, Russell County: Cities Service 1 Michael, S½ SW SW 3-15-13w, dry, T.D. 3,325 ft., Arbuckle 3,302 ft.

Zenith, Reno County: Skelly 2 Johnson, NW NE 6-24-10w, flowed 496 bbl. in 9½ hr., Viola 3,691-3,726 ft.

NEBRASKA COMPLETIONS

Wildcat, Richardson County: Ferguson & Towle 1 Ehbaurer, NW NW NE 2-2n-15e, dry, T.D. 2,520 ft.

Dawson, Richardson County: Joe Higgin 1 Redwood, E½ SW SW 11-1n-14e, dry, T.D. 2,385 ft.

Louisiana Gulf Coast

(Continued from Page 107)

9w, 373 bbl. through ⅛-in. choke, T.P. 3,150 lb., gas-oil ratio 1,282, perf. 8,134-8,210 ft., T.D. 9,112 ft., P.B. 8,240 ft.

Lafitte, Jefferson Parish: Texas B-2 Rigolet Cooperative Fur Co., 27-17s-24e, dry at 10,785 ft.

Lake Chicot, St. Martin Parish: Amerada and Phillips 1 Case et al, 24-11s-9e, 292 bbl. through 9/64-in. choke, T.P. 1,400 lb., gas-oil ratio 400, perf. 10,191-96 ft., T.D. 10,593 ft., P.B. 10,199 ft. New sand for this field.

Lake de Cade, Terrebonne Parish: Superior 1 La Terre Co., Inc., 27-19s-15e, O.W.W.O., old P.B. T.D. 10,936 ft., new P.B. T.D. 10,210 ft., 16 bbl. distillate through ⅛-in. choke, T.P. 3,475 lb., gas-oil ratio 77,264, perf. 10,200-6 ft. (Well to be used to provide fuel for development of field.)

Paradis, St. Charles Parish: Texas 10 Sunset Realty & Planting Co., 38-14s-20e, 227 bbl. through 9/64-in. choke, T.P. 1,440 lb., gas-oil ratio 736, perf. 10,390-10,405 ft., T.D. 11,000 ft., P.B. 10,408 ft.

Pine Prairie, Evangeline Parish: Pan American Production Co. 1 Crowell Land & Mineral Corp., 2-4s-1w, 170 bbl. through 9/64-in. choke, T.P. 1,000 lb., gas-oil ratio 974, perf. 8,626-70 ft., T.D. 8,999 ft., P.B. 8,801 ft.

Roy Lee, trustee (Hassie Hunt), 1 Crowell & Spencer Lumber Co., 35-3s-1w, 166 bbl. through ⅛-in. choke, T.P. 1,300 lb., gas-oil ratio 1,089, series of perforations from 10,194 to 10,519 ft., T.D. 10,600 ft., P.B. 10,554 ft.

Roy Lee, trustee (Hassie Hunt), 2 Crowell & Spencer Lumber Co., 2-4s-1w, 203 bbl. thrugh 11/64-in. choke, T.P. 1,200 lb., C.P. 1,950 lb., gas-oil ratio 1,096, perf. 8,676-8,721 ft., T.D. 8,846 ft., P.B. 8,793 ft.

Tepetate, Acadia Parish: Continental A-6 L. L. Welch, 28-7s-2w, O.W.W.O., old T.D. 8,306 ft., new P.B. T.D. 8,300 ft., 54 bbl. through ⅛-in. choke, T.P. 1,200 lb., C.P. 800 lb., gas-oil ratio 5,759, perf. 8,297-8,300 ft.

Venice, Plaquemines Parish: Tide Water et al 4 Manhattan Land & Fruit Co., 27-21s-30e, O.W.D.D., old P.B. T.D. 7,280 ft., new P.B. T.D. 8,275 ft., 210 bbl. through ⅛-in. choke, T.P. 1,200 lb., gas-oil ratio 380, perf. 8,250-65 ft.

Ville Platte, Evangeline Parish: Continental 1 Joe Tate, O.W.W.O., old T.D. 10,207 ft., new P.B. T.D. 9,857 ft., 115 bbl. fluid, 96.6 per cent pipe-line oil and 3.4 per cent wash water and mud, through 12/64-in. choke, T.P. 1,900 lb., gas-oil ratio 14,009, perf. 9,822-52 ft.

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CALIFORNIA

Two Pleasant Valley Tests Strike Oil Pay

LOS ANGELES, Calif.—Standard Oil Co. and R. S. Lytle picked up the productive Eocene oil sand in their respective wells in the Pleasant Valley field of Fresno County early this week and both wells should be ready for production tests within another 10 days. Standard made a formation test of No. 62-29-F in 29-20s-16e, and even though some additional hole will be made the well can be considered a commercial producer even at its present depth. R. S. Lytle picked up the top of the oil sand somewhat higher than it was cored in the discovery well but this was to be expected as the apex of the structure is believed to be located north and west of the initial completion. Standard 62-29-F is a westerly offset of the discovery well and Lytle 88-20-F is a northline offset two locations removed. East of Lytle 88-20-F, Standard Oil Co. is drilling a well in 21-20s-16e, that should pick up the pay within another 2 weeks and the log of this most easterly well should throw considerable light on existing subsurface conditions.

Kings County.—Shell Oil Co., Inc., is abandoning its Tulare Lake wildcat after drilling to 12,491 ft. and failing to find a productive oil or gas sand. This wildcat which was drilled out in the center of Tulare Lake has been one of the state's interesting wildcats. The derrick was erected in about 20 ft. of water and all equipment had to be hauled to the well by barge from the edge of the lake where a loading platform had been erected. This is one of the deepest wildcats to be drilled in the state during the past year. Tide Water Associated Oil Co. started a wildcat in McClure Valley but this test is just getting under way and it will be another 60 or 90 days before the objective is reached. This wildcat is 56 Orchard in 30-24s-18e.

Madera County.—Texas Co. failed to develop commercial production in the oil sand present in the Mendota gas field and plans were immediately undertaken to finish the well as a gasser. A formation test of the oil sand last week showed salt water with some oil in evidence but not enough to justify further testing. Pure Oil Co. which pioneered the Chowchilla region of Madera County several years ago and which completed several gas wells of questionable value is drilling a test in 28-10s-13e, not far from the scene of its first California operations. Actual drilling is being done by Bell & Loffland and coring has just been started.

Fresno County.—The two latest wildcats to get under way are General Petroleum 81-9 Sopac in Towne district on Southern Pacific acreage and Seaboard's wildcat about 1½ miles west of the Raisin City field. The former will be spudded within 15 days and the latter test will get under way soon thereafter. Superior Oil Co. failed to find anything in the Eocene in 81-22 Kreyenhagen in the Wheatville district of Fresno County in 22-17s-18e, and will have an abandonment on its hands unless the Miocene section at 6,700-6,900 ft. shows up better than the Eocene. This wildcat has been carried down to 9,562 ft. and has been plugged to 6,700 ft. from which point the hole will be redrilled for the Miocene test.

SAN JOAQUIN VALLEY COMPLETIONS

Belridge, South, Kern County: Belridge Oil Co. 67-34 fee, 34-28s-21e, pumped 70 bbl. 13.8°, 12 per cent cut, T.D. 790 ft., perf. 454-790 ft., South Belridge zone of Pleistocene age.

Belridge Oil Co. 77-34-A fee, 34-28s-21e, pumped 67 bbl., 13.9°, 10 per cent cut, T.D. 782 ft., perf. 460-782 ft.

General Petroleum Corp. 4-12, 12-29s-21e, pumped 35 bbl. net, 12.2°, 25 per cent cut, T.D. 1,110 ft., perf. 954-78 ft., 1,017-90 ft.

General Petroleum 84-2, 2-29s-21e, pumped 51 bbl. net, 17.4°, 21 per cent cut, T.D. 1,000 ft., P.B. 997 ft., perf. 563-668 ft., 695-755 ft., 870-99 ft.

Shell Oil Co., Inc., 42-12 F.K.L., 12-29s-21e, pumped 127 bbl., 16.8°, 20 per cent cut, T.D. 1,140 ft., perf. 1,005-45 ft., 1,180-1,138 ft.

Coalinga, East, Fresno County: Shell 176-29 fee, 29-19s-15e, pumped 78 bbl., 19.8°, 0.5 per cent cut, T.D. 2,533 ft., perf. 2,444-2,531 ft., East Coalinga zone of Pliocene age.

Shell 168-34 fee, 34-19s-15e, pumped 110 bbl., 19.9°, 0.3 per cent cut, T.D. 2,896 ft., P.B. 2,670 ft., perf. 2,535-2,667 ft.

Standard 18-35-A fee, 35-19s-15e, pumped 28 bbl., 20.6°, 0.1 per cent cut, T.D. 3,285 ft., perf. 3,113-3,215 ft.

Standard 57-35-A fee, 35-19s-15e, pumped 75 bbl., 20.7°, 0.2 per cent cut, T.D. 3,325 ft., perf. 3,210-3,323 ft.

Standard 62-35-A fee, 35-19s-15e, pumped 39 bbl., 20.8°, 7 per cent cut, T.D. 3,380 ft., P.B. 3,262 ft., perf. 3,134-3,250 ft.

Cymric wildcat district, Kern County: Doheny-Battson-Los Nietos Co. 1 Sheep Springs, 20-29s-21e, dry, T.D. 5,276 ft., top Tulare oil show 1,001 ft., top Etchegoin 1,683 ft., top brown shale 2,513 ft., Valvulineria 3,400-86 ft., Kreyenhagen 4,635 ft., Point of Rocks sandstone 5,020 ft.

Elk Hills, Kern County: U. S. Navy 45-2-G, 2-31s-24e, pumped 142 bbl., 26.7°, 0.1 per cent cut, T.D. 3,016 ft., P.B. 2,590 ft., perf. 2,869-2,947 ft., Tupman zone of Pliocene age.

Kern Front, Kern County: Standard 21-5 fee, 5-28s-27e, pumped 30 bbl. net, 13.2°, 55 per cent cut, T.D. 2,885 ft., perf. 2,710-2,883 ft., Kern Front zone of Pliocene age.

Standard 24-5 fee, 5-28s-27e, pumped 93 bbl., 12.7°, 15 per cent cut, T.D. 2,818 ft., perf. 2,634-2,815 ft.

Standard 44-15 fee, 15-28s-27e, pumped 57 bbl., 12.4°, 5 per cent cut, T.D. 2,325 ft., perf. 2,192-2,323 ft.

Standard 45-15 fee, 15-28s-27e, pumped 93 bbl., 12.7°, 5 per cent cut, T.D. 2,272 ft., 100 mesh perf. 2,030-2,270 ft.

Kettleman North Dome, Kings County: Standard 61-35-A fee, 35-22s-18e, flowed compressor 113 bbl., 43.8°, 30 per cent cut, 4,700,000 cu. ft., net formation gas, T.D. 8,140 ft., perf. 6,898-6,940 ft., 7,138-7,225 ft., 7,385-7,430 ft., 7,630-7,845 ft., 7,985-8,137 ft., Temblor zone of Miocene age.

Lost Hills, Kern County: Universal Consolidated Oil Corp. 51 fee, 32-26s-21e, pumped 2 bbl., 18.2°, 25 per cent cut, 220,000 cu. ft. gas, T.D. 1,674 ft., perf. 1,218-1,767 ft., Lost Hills zone of Pliocene age.

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Midway-Sunset, Kern County: Otis Hoyt 52 Midway, 15-32s-23e, pumped 28 bbl., 20.5°, 0.1 per cent cut, T.D. 2,990 ft., P.B. 2,863 ft., perf. 2,524-2,863 ft., Midway zone of Pliocene age.

Richfield Oil Corp. 28 United, 20-31s-23e, dry, T.D. 3,200 ft.

Ring Oil Co. 1 Richardson, 7-11n-23e, dry, T.D. 3,605 ft.

Union 5 Midway Northern, 7-11n-23e, pumped 130 bbl., 12.9°, 5 per cent cut, T.D. 1,931 ft., P.B. 1,900 ft., perf. 1,776-1,900 ft., Maricopa zone of Pliocene age.

Vedder Petroleum Corp. 4 Vedder, 9-31s-22e, dry, T.D. 1,278 ft.

Mountain View wildcat district, Kern County: Di Giorgio Fruit Co. 4 Mountain View, 10-31s-29e, in granite 5,841-50 ft.

Tulare Lake wildcat district, Kings County: Shell 21 S.T.G., 28-22s-20e, dry, T.D 12,491 ft.

Test on Hidden Anticline Being Abandoned

Another unsuccessful wildcat was charged against Ventura County this week when Tide Water Associated Oil Co. began abandonment work on its second wildcat on the Hidden anticline in 5-4n-18w. This wildcat was carried down to 8,250 ft. and only showings of negligible value were logged from top to bottom. Continental's 2 Holser on Ramona anticline has also taken on a doubtful outlook as it appears to have missed the productive zone encountered in Continental's discovery well on the same property. Standard has staked location for a new wildcat to be drilled about 1 mile north of Fillmore in 24-4n-20w. Standard's new well will be drilled on a community lease in a section where the company has tied up large holdings. General Petroleum Corp. successfully killed a gas blowout in the Ventura Avenue field this week when 27 Barnard blew out with bottom of the hole at 3,022 ft. Estimated daily blow was at rate of 7,500,000 cu. ft. and when the well was killed the drill pipe froze at 2,996 ft. The presence of this upper gas sand has been known for many years but it has always been cased off.

COASTAL DISTRICT COMPLETIONS

Cat Canyon, Santa Barbara County: Pacific Western Oil Co., 20 Los Alamos, 36-9n-33w, pumped 290 bbl., 15.3°, 5 per cent cut, T.D. 5,900 ft., perf. 5,289-5,898 ft., Los Flores zone of Miocene age.

Gato Ridge, Santa Barbara County: O. C. Field Gasoline Corp., 2 Texas fee, 4-8n-32w, pumped 58 bbl., 18°, 1 per cent cut, T.D. 2,792 ft., perf. 2,431-2,786 ft., Tognazzini zone of Miocene age.

Newhall Potrero, Los Angeles County: Barnsdall, 35 R.S.F., 36-4n-17w, flowed 158 bbl., 33°, 0.1 per cent cut, 300,000 cu. ft. gas, 33/64-in. bean, T.D. 7,370 ft., perf. 6,700-6,880 ft., 6,912-7,008 ft., second Modelo zone of Miocene age.

Piru wildcat district, Ventura County: T.W.A.O. Co., 2 Hidden, 5-4n-18w, dry, T.D. 8,250 ft.

Los Angeles City Field To Be Redrilled

Although Shell got a dry hole in the old Salt Lake field, plans are under way to permit limited drilling in the old Los Angeles City field in conformity with a proposed ordinance which is being framed with the approval of PAW to regulate the amount of drilling which will be permitted and the areas which will be opened to the drill. Shell proved that drilling operations can be carried on without obnoxious noises or odors and the new ordinance will undoubtedly be designed along the lines followed out by Shell in the Salt Lake field.

LOS ANGELES BASIN COMPLETIONS

Brea, Orange County: Union, 77 Stearns, 7-3s-9w, pumped 129 bbl. net, 21.1°, 8 per cent cut, T.D. 4,100 ft., P.B. 3,345 ft., perf. 3,076-3,343 ft., Brea Olinda zone of Pliocene age.

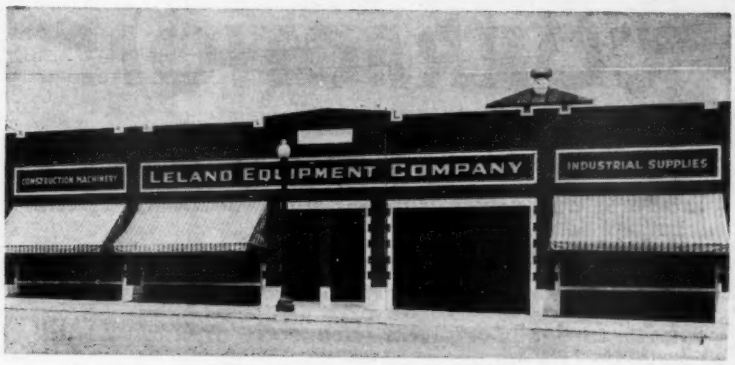
Costa Mesa wildcat district, Orange County: A. A. Carrey, 1 Meyer, 16-6s-10w, dry, T.D. 1,717 ft.

Coyote, West, Orange County: Standard, 132 Murphy Coyote, 17-3s-10w, flowed 972 bbl., 30.4°, 7.2 per cent cut, 600,000 cu. ft. gas, 32/64-in. bean, flow pressure 225 lb., T.D. 6,115 ft., perf. 5,735-6,112 ft., Murphy zone of Pliocene age.

Huntington Beach, Orange County: Standard, 44-A H. B., 3-6s-11w, pumped 63 bbl., 15.8°, 0.8 per cent cut, T.D. 3,466 ft., perf. 3,342-3,464 ft., Bolsa zone of Pliocene age.

Zastrow Oil Co., 1 H. B., 36-5s-11w, pumped 40 bbl., 18.1°, 3 per cent, T.D. 3,906 ft., perf. 3,861-3,905 ft., upper Ashton zone of Pliocene age.

Torrance, Los Angeles County: Texas, 8 Oakley, 30-4s-13w, pumped 50 bbl. net, 17.5°, 18 per cent cut, T.D. 3,665 ft., perf. 3,530-3,665 ft., Ranger zone of Pliocene age.



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NORTH LOUISIANA

Stephens Field Is Active Spot in Arkansas

SHREVEPORT, La.—Drilling in the North Louisiana and Arkansas area is showing signs of picking up after getting off to a slow start in the early spring. The Stephens field, in Columbia, Ouachita and Nevada counties, has surpassed the New London pool in the number of active wells, having 16 operations under way last week. Four wells were reported to be drilling at New London. In the Haynesville extension field, Columbia County, Navarro Oil Co. 4 S. J. Beene gaged 25 bbl. of oil a day through ¼-in. choke.

ARKANSAS COMPLETIONS

Wildcat, Miller County: Northern Ordnance 1 Adcock, NW NW 1-19s-28w, dry, T.D. 6,706 ft., Midway 1,126 ft., Nacatoch 2,022 ft., Saratoga 2,570 ft., Tokio 3,405 ft., Paluxy 3,955 ft., Glen Rose 5,247 ft., core 6,598-99 ft., recovered porous lime with slight show distillate.

Macedonia, Columbia County: McAlester Fuel 2 J. S. Whitehead, C N½ NE 19-18s-21w, dual completion, Smackover lime 8,914 ft., Cotton Valley 8,832 ft., flowed 55 bbl. distillate through ¼-in. choke in Cotton Valley, no test in Smackover, T.D. 8,975 ft.

CORRECTION

In this same issue on page 72 the statement is made in our advertisement that "Jerguson is the originator and developer of the reflex-gage in this country. In fact, all reflex gages of today are made under Jerguson licensed arrangement." Part of this statement is incorrect and we take this opportunity to make an immediate correction.

Not all reflex gages are made under Jerguson licensed arrangement as stated, but some manufacturers are licensed by us to construct reflex gages: "With bolts entirely embracing the chambers of the gage thus greatly strengthening the entire assembly."

We greatly regret that this error occurred in our original advertisement and that we were unable to correct it before that particular form had been printed. We take this opportunity, however, of correcting the erroneous statement as quickly as possible.

JERGUSON GAGE & VALVE CO.

85 Fellsway **Somerville, Mass.**

NORTH LOUISIANA COMPLETIONS

Wildcat, Winn Parish: Mansfield Hardware Co. 1 fee, SW SE 8-12n-4w, dry, T.D. 6,340 ft., Annona 2,820 ft., Austin 4,130 ft., Eagleford 4,480 ft., lower Cretaceous 4,890 ft.

Caddo, Caddo Parish: Texas 13 J. A. Russell, NW NE SW 3-20n-16w, dry, T.D. 2,327 ft., Tokio sand 2,250 ft.

Haynesville, Claiborne Parish: Midstates Oil 1 J. P. and V. E. Lowe, S½ SW NW 4-23n-8w, pumped 108 bbl., Pettit 5,398-5,405 ft., 5,452-60 ft., T.D. 5,461 ft.

Hosston, Caddo Parish: Bayou State Oil Corp. 30 Caldwell, SE NW NW 29-22n-15w, dry, T.D. 1,097 ft.

Monroe gas, Union Parish: J. E. Farrell 7 Union Steel, NW SE NE 35-20n-3e, 6,272,000 cu. ft. gas open flow, 695 lb. R.P., T.D. 2,158 ft., acidized.

Pine Island, Caddo Parish: Bagley & Lewis 2 Vaughan, W½ NE SW 7-21n-14w, pumped 20 bbl. oil and 15 bbl. water, T.D. 1,665 ft., acidized.

MISSISSIPPI

JACKSON, Miss.—California Co. was moving in material for 1 Natural Gasoline Co. of Louisiana, Inc., Adams County wildcat in 52-7n-1w. That company's 1 G. T. Smith, in 4-7n-7e, Lincoln County, was swabbing through 2-in. tubing, testing the zone from 10,288 to 10,322 ft., where previous tests recovered 24-gravity oil. Total depth of the hole is 12,229 ft., plugged back to 10,325 ft.

Gulf Refining Co. has staked location for 1 Sarah B. Cupit et al, 30-8n-4e, Jefferson County, and for 1 E. H. Bradshaw, 20-3n-17w, Marion County. Gulf set 10-in. casing at 743 ft. in 1 Arden Davis, 2-9n-9w, Wayne County, and was waiting for cement to set.

Pure Oil Co. 1 McDowell, 1-6n-4w, Adams County, was testing at 10,287 ft. in sidetracked hole, with slight oil shows reported. Humble Oil & Refining Co. 1-B L. N. Dantzler Lumber Co., 20-5s-8w, Jackson County, was drilling at 10,573 ft. in shale.

Rocky Mountain Area

(Continued from Page 98)

4,485 ft., top Shannon sand 4,490 ft., pumped 105 bbl. per day.

Dewey, Weston County: W. H. Connor 1 State, NW SW NE 36-42n-61w, abandoned in Madison, 2,890 ft.

Oregon Basin, Park County: Ohio Oil Co. 2-A Baston, NW SW NE 5-50n-100w, T.D. 4,451 ft., 245 bbl. per day from the Embar.

Ohio Oil Co. 5-A Baston NW SE NE 5-50n-100w, T.D. 4,510 ft., 5½-in. 4,381 ft., 250 bbl. per day from Embar.

MONTANA COMPLETIONS

Bowdoin, Phillips County: Montana-Dakota Utilities Co. 659 Veseth, T.D. 1,083 ft., Phillips sand 933-955 and 995-1,030 ft., no Bowdoin sand, 5½-in. 887 ft., 4½-in. perf. on bottom, 196,000 cu. ft. of gas, 310-lb. pressure.

Montana-Dakota Utilities 606 Veseth, C NW NW 32-33n-32e, T.D. 1,155 ft., Bowdoin 905-930 ft., Phillips 1,095-1,125 ft., 196,000 cu. ft., 200-lb. pressure.

Kevin-Sunburst, Toole County: Enfield Oil Co. 9 Zachor, NE NE NW 20-35n-1w, T.D. 1,613 ft., P.B. to 1,608 ft., contact 1,596-1,608 ft., 20 bbl. per day after acid, 500 gal.

April Completions Continue Increase Started in March

FOR the second consecutive month this year, completions have shown an increase. There were 58 more completions and 61 more oil wells found than in the preceding month. Illinois completions went from 135 in March to 156 in April and the Appalachian total jumped from 210 wells in March to 262 in April. Western Kentucky operations accounted for an increase of 16 wells last month. While Oklahoma's operations continued their decline, Kansas is showing a good increase in the number of wells being drilled. This is not reflected in the table as completions for April are for 4 weeks, compared with 5 weeks in March. Active rigs and drilling wells for the entire country show an increase of 107 over the previous month.

Wells in the 5,000 to 10,000-ft. class have again increased, February completions in this category were 144, March 179 and 206 in April. This condition is reflected in the upper and lower Gulf Coast fields as well as in South Texas.

Total completions for the same period last year was 1,449, only 7 per cent over April completions this year. Drilling wells have increased nearly 7 per cent over last year, when only 2,270 wells reported actively drilling.

SUMMARY OF OPERATIONS, APRIL 1943

	Comp.	Oil	Prod.	Gas	Dry	Under 1,000 ft.	1,000-2,500 ft.	2,500-5,000 ft.	5,000-10,000 ft.	Over 10,000 ft.	Footage	Rigs and drlg.
Appalachian	262	202	401	53	7	0	231	22	9	0	511,427	280
Ohio	62	10	312	35	17	9	21	30	2	0	150,142	177
Indiana	17	5	229	2	10	5	11	1	0	0	21,453	25
Kentucky	45	24	4,200	11	10	0	14	31	0	0	107,528	130
Michigan	34	11	2,240	1	22	0	14	20	0	0	97,978	101
Illinois	156	84	9,014	2	70	8	54	94	0	0	366,640	155
Kansas	126	63	25,325	1	62	0	13	113	0	0	424,728	193
Nebraska	0	0	0	0	0	0	0	0	0	0	0	1
Missouri and Iowa	1	0	0	0	1	1	0	0	0	0	560	1
Oklahoma	84	41	4,540	4	39	4	23	41	16	0	282,821	231
North Texas	87	34	12,134	0	53	9	42	25	11	0	211,204	79
West Central Texas	25	5	546	0	20	5	6	13	1	0	57,726	61
West Texas	66	56	24,493	0	10	0	8	35	23	0	298,114	179
Texas Panhandle	13	9	882	4	0	0	13	0	0	0	40,512	21
East Texas	21	10	3,119	0	11	0	0	5	16	0	97,177	7
Upper Gulf Coast	33	22	4,535	0	11	0	0	3	27	3	229,873	80
Lower Gulf Coast	37	28	3,731	3	6	0	0	5	32	0	228,469	72
South Central Texas	11	0	0	0	11	3	5	2	1	0	28,011	11
South Texas	43	14	1,852	0	29	1	10	21	11	0	162,304	55
Southeast New Mexico	11	7	1,667	1	3	0	2	9	0	0	34,270	33
Arkansas	15	9	1,287	0	6	0	1	9	5	0	67,009	45
North Louisiana	24	9	2,142	4	11	0	4	8	10	2	120,144	45
Louisiana Gulf	24	13	2,312	0	11	0	2	1	15	6	210,390	92
Mississippi	11	4	789	0	7	0	0	9	2	0	64,914	12
Montana	15	11	1,084	2	2	0	8	7	0	0	34,222	76
Wyoming	13	10	3,615	0	3	0	1	7	5	0	58,746	71
Colorado, Utah	2	1	50	0	1	1	1	0	0	0	2,181	16
Northwest New Mexico	2	1	25	1	0	0	1	1	0	0	3,798	12
California	111	84	9,753	6	21	5	37	47	20	2	376,759	146
Florida	0	0	0	0	0	0	0	0	0	0	0	3
Alabama	0	0	0	0	0	0	0	0	0	0	0	3
Total April	1,351	767	120,277	130	454	51	522	559	206	13	4,289,098	2,413
Total March	1,292	706	127,204	154	434	44	450	607	179	16	4,216,812	2,306
Difference	58	61	6,927	24	20	7	72	48	27	3	72,286	107

CANADIAN FIELDS

Athabaska District Test Is Spudded

CHATHAM, Ont.—In the Athabaska district of northern Alberta, about 100 miles north of Edmonton, Deca Syndicate 2, LSD 3, 16-66-23w4, has spudded. Location is about 1 mile west of the discovery well, Athadome 2, which in 1933 found oil in a 50-ft. sand at 1,651 ft. Deca Syndicate is jointly sponsored by Davies Petroleums and East Crest Oil Co. and is one of a series of tests to be drilled on a 11 by 10-mile block south of the Athabaska River. Deca 1, LSD 1, 4-66-22w4, will be drilled after the present well is completed. Rotary equipment is being used and it is expected that, after the initial test, wells will not require more than 10 or 12 days to drill.

TURNER VALLEY COMPLETIONS

North Extension: National-Vulcan 1, LSD 15, 5-21-3w5, Madison 8,565 ft., 250 to 300 bbl. from the upper porous after partial acidization, T.D. 8,740 ft.

North Turner Valley: Miracle Royalties 3, LSD 13, 33-20-3w5, Madison 7,870 ft., 300 bbl., gas-oil ratio 21,000 cu. ft.. After a week's production it made 571 bbl. on 24-hr. test with gas-oil ratio down to 3,443 cu. ft., T.D. 8,164 ft.

Southern plains.—In the southern plains area of Alberta, McColl-Frontenac Oil Co. has secured exploration permit covering 589,919 acres on which survey work is being started by two geological parties. The first reservation extends from a point east of the Cypress Hills to west of Seven Persons, and include the Eagle Butte area. The second reservation extends south and west of this to a point north of Etzikom; while the third, still farther south, includes Etzikom Coulee and Pakowki Lake and runs to within 18 miles of the Montana boundary. Previous tests in these areas included the Stokes-Stephens 1, 25-2-11w4, abandoned at 798 ft.; Sanctuary Oil-Pakowki Lake 1, LSD 10, 10-5-8w4, abandoned at 2,845 ft. after striking seven gas shows and traces of oil; and two Eagle Butte deep tests. Of these, Eagle Butte 1, LSD 9, 31-7-4w4, finished below the Sunburst sand at 4,002 ft. with numerous gas shows including 20,000,000 cu. ft. at 3,340 ft. Eagle Butte 2, LSD 4, 30-7-3w4, finished at 4,725 ft., with Madison limestone at 4,550 ft., and also encountered some gas.

Northern prospectors.—Prospectors going north from Edmonton in search of oil or minerals must carry identification cards issued by the Mines and Geology branch at Ottawa. These cards must be presented to local ration boards before supplies can be obtained for such trips. Cards can be obtained from L. G. Drummond, secretary-manager of the Alberta and Northwest Chamber of Mines at Edmonton.

P-98-b Under Controlled-Materials Plan

(Continued from Page 44)

of the purchase order to the PAW office in the district in which the operations are being or are to be performed. Information obtained from these copies of the purchase orders is used by PAW in determining and representing petroleum industry needs for a number of critical common components which are required not only by petroleum industry operators but by other industries. This information is also used by PAW as a check in determining the controlled-material requirements of the petroleum-equipment manufacturers.

When the total cost of all items covered by a purchase order or contract is $1,000 or more in cost, or when the cost of any single item on a purchase order or contract is $500, or more, the operator must send two copies of the purchase order to the PAW office in the district in which the operations are to be performed and secure a countersignature from the PAW district office as authorization to use the preference rating assigned for the operator's use by Form PD-873. One copy of the purchase order, properly countersigned in the PAW district office, will be returned to the operator and the second copy is retained by PAW to assist them in determining current use, and, in turn, the future requirements of material which are required for production operations.

Capital-Investment Rating

The preference rating which is currently assigned for the operator's use in purchasing capital-investment materials is AA-2X. This is the rating which will now be assigned by PAW on PD-873 applications for the operator's use in connection with the purchase of capital-investment materials for those operations which are described by the operator on the application.

The allotment number assigned on Form PD-873 for an operator's use in purchasing controlled materials must not be used by the operator for the purchase of more controlled materials than are allotted by PAW in the space or spaces provided on the form. When controlled materials, and remember we are talking primarily about oil-country tubular goods, are required in addition to those controlled materials for which an allotment number has been previously assigned, a new Form PD-873 application must be filed for the additional controlled materials. This application, like all other Form PD-873 applications, must be filed in the PAW office of the district in which the operations are to be or are being performed. Normally, the allotment number will not be used by the operator for other than controlled materials. When in the operator's opinion, or in the seller's judgment, the allotment number should be used for the acquisition of capital-investment materials, other than controlled materials, there is nothing wrong with extending the allotment number in addition to the preference rating.

Equal Division of Allotment

To the extent that an operator's operations permit or to the extent suggested or specified by PAW, the operator's use of a quarterly allotment number must be divided equally by months during the quarter and not restricted to use in 1 or 2 months in the quarter.

If an operator does not use within 30 days, the entire allotment of controlled materials available to the operator through the use of an allotment authorized on the PD-873 application, the operator must notify the Washington office of the PAW of the number of tons or thousands of pounds of controlled materials for which the operator has not used the allotment number. This is necessary because some other operator may be in early or dire need of an allotment of a like or smaller amount of materials, while PAW's storehouses of allottable materials have been completely dissipated.

A proper understanding of, and appreciation for, these potential conditions by industry operators and proper cooperation between operators, suppliers and the PAW will enable the petroleum industry to obtain full use, not just partial use, of the controlled materials which are allotted PAW as claimant agency for distribution among petroleum industry operators for the conduct of essential petroleum industry production and other operations.

For all practical purposes, P-98-b establishes the only allotment and preference rating procedures which are now available to petroleum industry operators to the extent that these operators are engaged in petroleum industry operations. There are modest exceptions to this statement in so far as the operations of a relatively small number of operators are concerned. Generally speaking, however, and in so far as the vast majority of petroleum industry operations are concerned, this is a complete statement. It thereby becomes unnecessary for the majority of petroleum industry operators to refer to any priority order or regulation or CMP regulation, other than P-98-b, for a procedure to be followed in obtaining an allotment number or an allotment number and preference rating which are required for use in acquiring either maintenance and repair materials, controlled materials or capital-investment materials whether or not these are controlled materials.

It is always necessary that all operators project their plans well into the future and that operators, suppliers, and manufacturers maintain, or be placed in a position to maintain, small stocks of materials required for petroleum industry operations, as long as the demand for all materials, which are made in whole or in part of controlled materials, exceeds the supply of these, it is going to be necessary that their production and manufacturing be scheduled to balance the supply of and demands for controlled materials and manufactured items. This required planning on the part of petroleum industry operators, suppliers and equipment manufacturers and the arranging of operations and the ordering of materials for operations in an orderly manner to make the materials actually available to the operator when they are required. Ordering should be sufficiently in advance to guarantee delivery of the material on or by the day the material is actually required. Inventory and use restrictions of materials prohibit delivery too far in advance of the day the material is actually required for use.

Higher Preference Appeals

In an occasional instance, however, the AA-1 preference rating available for use in acquiring maintenance and repair materials, or operating supplies, or the AA-2X rating with or without an allotment number, which is presently available for use in purchasing capital-investment materials, including controlled materials, is not high enough to guarantee delivery of the material by the time the material is actually required by the operator. When this occurs the operator should send, in duplicate, the applicable purchase order for the material to the PAW office of the district in which the operations are to be performed, or the PAW office of the district in which the operator's purchase order is issued. This should be attached to a letter giving in detail the customary information as to why and when the material is needed, from whom it is to be obtained, the rating that is required to get delivery by the date the material is required and other pertinent information. Except in emergency cases where the special provisions of Paragraph e apply, this should not be done until the operator has explored all potential sources of supply, including stocks of second-hand material and considered the substitution of less critical material, the putting of idle material to use, or the diversion of material which is only partially being used or is not being gainfully used in some other operation. When the PAW district office is unable to expedite the delivery of this material, the purchase order, with attached letter, will be forwarded to the Washington office of PAW where a higher rating will be assigned or where the delivery of the material will be actually expedited.

Among the

Drilling Contractors

Kingery Brothers Drilling Co. has the contract on a 3,000-ft. wildcat to be drilled by Fidelity Royalty, Glen Norville and Frank Buttram, all of Oklahoma City, Okla., at the 1 R. A. Hefner, in NW NE NW 13-2n-5w, about 1½ miles south of the Carter-Knox area in northern Stephens County, Oklahoma. The test was drilling below 500 ft. last Saturday, after setting surface pipe.

Delta Drilling Co. has been awarded contract to deepen L. A. Grelling 1 Stanley, W. B. Jordan Survey, Paluxy sand failure in southwestern Franklin County, Texas. Delta will take the wildcat down to 8,500 ft. from its present depth of 6,160 ft. The wildcat found the Paluxy at 6,070 ft. but failed to find a showing of oil.

Sooner Drilling Co. has been awarded contract for a wildcat 4 miles south of Booneville, Ark., hole for which has been started by a group of Oklahoma City, Okla., interests. The test is the Star Manufacturing Co. 1 Jack Foster, in SW NE 26-5n-28w, Logan County. A heavy diesel-power unit has been moved in.

Falcon-Seaboard Drilling Co., Houston, Tex., will drill a Smackover lime test, 1 Shaw, in the Homer field, Claiborne Parish, Louisiana. The well is a joint operation by George and Frank Frankel and the contracting company.

Franklin & Tidemann, Ltd., Houston, Tex., have contracted to drill a 7,000-ft. wildcat test, 1 Dallmeyer, for Champlin Refining Co. in Washington County, Texas, 2½ miles north of Burton. This contracting firm recently completed 1 Boyt, a dry hole at 7,995 ft., in Liberty County, Texas, for Yegua Oil Corp.

Lon H. Cron, Houston, Tex., who recently completed 1 S. G. Anderson, in the Citrus Grove area of Matagorda County, Texas, as a gas well for Continental Oil Co., has moved the rig to Wharton County, J. Villa Survey, where he will drill 1 Louisa G. Peterson, a wildcat, for Continental. This contractor has started work on B-17 Clara Driscoll, in the S.K.&K. Survey, Driscoll field, Duval County, for the same company.

T. J. Conway, drilling contractor on the Mae Belcher 1 Beulah Workman, 2,500-ft. Woodbine wildcat test in the N. Daugherty Survey, 4.5 miles southwest of Kaufman, Kaufman County, Texas, spudded the test last Saturday and expected to set surface pipe Sunday, weather permitting.

Wynn Crosby Drilling Co., Houston, Tex., last week spudded 1 J. E. Jackson, a wildcat test in the R. C. Frankland Survey, 13 miles south of Anahuac, in Chambers County, Texas, which the contractor will drill for itself, in conjunction with Kirby Petroleum Co. and John G. Mayo. The acreage is farmed out by Gulf Oil Corp. Crosby recently completed 1 Acon, in the Anahuac field, Chambers County, for British American Oil Producing Co., a dry hole at 9,430 ft.

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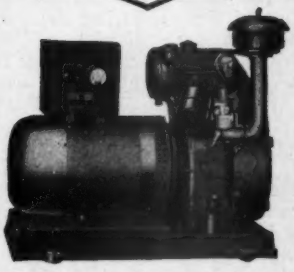

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PERSONALS

J. E. GOSLINE

Engineer Appointed To Newly Created Production Post

J. E. GOSLINE has succeeded L. B. Little as manager of the southern district of the producing department of Standard Oil Co. of California and in his new capacity will maintain offices at Los Angeles.

Mr. Little, who retired after 35 years' service with Standard of California, was general superintendent of production.

Mr. Gosline's position is newly created. He will be in charge of all activities of the producing department in the southern district which includes all Los Angeles Basin fields as well as those along the eastern rim of the basin in Orange County.

Mr. Gosline was first employed by Standard of California September 1, 1933, as an engineer in the general engineering department of the home office at San Francisco. On January 1, 1934, he was transferred to the producing department as petroleum engineer but remained at the home office in San Francisco. He continued in that capacity until January 1, 1942, when he was made supervising petroleum engineer in charge of production problems, maintaining headquarters at the home office of the company, until his recent promotion and transfer to Los Angeles.

Bender R. Jones, with six citations for heroism and now at his home in Houston, Tex., following a medical discharge, was employed in the pipefitting department of the Sinclair Refining Co.'s refinery, Houston, before enlisting in the submarine service in 1939. He was a machinist's mate, first class, on Comdr. Howard Gilmore's submarine when that officer, lying wounded on his conning tower after the submersible had been driven into the side of a Japanese gunboat, pronounced his own doom with the order, "Take her down."

John R. Suman, vice president and director of Humble Oil & Refining Co., Houston, Tex., was the speaker at the launching of the Liberty ship Anson Jones at the yards of Houston Shipbuilding Corp. "The United States is winning the battle of production," declared Mr. Suman. The new ship was named for the last president of the Republic of Texas.

Second Lt. Frank H. Harrell, recently commissioned after completing the course at the officers candidate school at Fort Monmouth, New Jersey, was a draftsman in the civil engineering department of Gulf Oil Corp., Houston, Tex., when he entered military service in October 1942. Lieutenant Harrell is now attending a specialty school at Fort Monmouth.

L. O'DONNELL

Lawrence O'Donnell, chief mechanical engineer for Shell Oil Co., Inc., Houston, Tex., has been elected president of the Technical Club of Houston. **W. A. Davis,** Houston district manager of Baker Oil Tools, Inc., was chosen vice president, and **Lynn Meador,** purchasing agent for Quintana Petroleum Corp., secretary-treasurer. The next important affair on the club's calendar is the spring picnic, to be held Friday, June 11, at the Brae-Burn Country Club. The organization is composed of men employed in engineering and other technical capacities in the oil industry.

Rodney Mitchell, formerly employed by Salt Dome Oil Corp., Houston, Tex., has not lacked for adventure since he entered war service. Young Mitchell, seaman first class, who was home on leave recently, served as a "crash boat" coxswain in the Pacific war theater. A "crash boat" lands Marines on Japanese held islands, then goes back to the transport, sometimes under fire, for another load. Seaman Mitchell worked as a roustabout in the O'Hern oil field, Webb County, Texas, where his father, **Paul Mitchell,** is lease superintendent for Salt Dome.

H. A. WALLACE

Hugh A. Wallace, engineer, who has served with the Texas State Highway Department and the Southwestern Division of the U. S. Engineers, has been appointed district engineer for Texas, Oklahoma, and Arkansas in the organization of the Asphalt Institute. He will headquarter in the Southwestern Life Building, Dallas, Tex.

J. C. Reeder, superintendent of Union Oil Co.'s Wilmington refinery, has been acting manager of the plant for some time as **R. B. Bray,** manager of the plant, has been granted a leave of absence to assist in the office of PAW.

J. B. Aug Kessler, managing director of the Shell Transport & Trading Co., Ltd., London, top company in the Royal Dutch-Shell group, is spending several weeks in the United States conferring with officials in charge of domestic operations.

K. C. Wallace, California independent oil producer, has disposed of his holdings in the Temblor field and will spend the next several months on his Cuyama ranch before getting back in harness again. He has retained all of his wildcat and semiproved acreage in the San Joaquin Valley.

Loren W. Dillard, who has been head well puller in the Long Beach division of Shell Oil Co., Inc., has been promoted to production foreman and will remain in the Long Beach area.

T. H. Kerr, long associated with the Ohio Fuel Gas Co., has joined the staff of the engineering experiment station of Ohio State University. Since graduating from Carnegie Institute of Technology in 1909 with a degree in mechanical engineering, he has been identified continually with some

phase of the gas industry. He has served with the Ohio Fuel Gas Co. and predecessor organizations for 29 years. Recently he retired as vice president and chief engineer of Ohio Fuel, although continuing as a director.

Xerna R. Campbell, Springfield, Mo., has been appointed deputy director of ODT's Division of Railway Transport in charge of oil movement at St. Louis, Mo., where he is now making headquarters.

LEE VAN ROBERTS

Lee Van Roberts, general attorney for the Shell Oil Co., Inc., for the past 12 years, has been appointed counsel for District 1, PAW, according to an announcement by **H. W. Dodge,** district director. He was born in Iowa, attended the University of Iowa, graduated from Columbia University law school.

H. I. Casteel, vice president, Republic Oil Refining Co., and **William Jones,** Gulf Oil Corp., have been initiated into the Propeller Club of Pittsburgh, Pa.

C. B. Miller, superintendent of warehouses in eastern Venezuela for Mene Grande Oil Co., is in this country on a business trip. Mr. Miller has been in Venezuela since 1926.

Hoyt Sherman, general manager of Mene Grande Oil Co. in eastern Venezuela, is visiting his mother at her home in Staunton, Va.

Edward C. Borrego, drilling superintendent for the Standard Oil Co. of Venezuela in the Jusepin field, who recently returned to this country to join the Army, is now a captain associated with the Office of Provost Marshal General assigned to the Seventh Service Command at Fort Custer, Michigan. After a month there he will be transferred to one of the universities for training in foreign government.

Joseph A. Holmes, technical adviser to the management of the Standard Oil Co. of Venezuela with which he has been associated for the past 10 years, is now visiting in this country.

John A. Brown, president, and **A. F. Corwin,** vice president of Socony-Vacuum Oil Co., and **B. A. Little,** president, and **R. M. Chan,** vice president, of Magnolia Petroleum Co., were in Corpus Christi, Tex., last week for an inspection of Magnolia properties in that area. They also visited the Naval Air Training Center, near Corpus Christi. **Robert T. Wilson,** president of La Gloria Corp., entertained the visitors. Before going to Corpus Christi the four made a tour of the Old Ocean field, in Brazoria County, Texas. Later Mr. Brown and Mr. Corwin returned to their offices in New York. Mr. Little and Mr. Chan went to Dallas, Tex., headquarters of Magnolia.

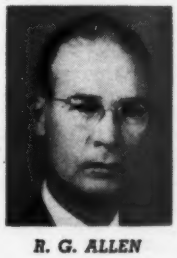
M. H. Robineau was reelected president of the Frontier Refining Co. at the annual meeting at Cheyenne, Wyo., on May 19. A $4,000,000 addition to the Cheyenne plant to enable it to produce 100-octane gasoline will be completed in September, it was announced.

T. J. Donoghue, retired vice president of Texas Co., has been named chairman of a committee to raise funds for a camp for newsboys and underprivileged youngsters. As a boy Mr. Donoghue sold newspapers in the streets of Bradford, Pa. About 235 boys will be sent to Camp Ross Sterling, Jr., for a week this summer.

William B. Golush, technical assistant at the Wilmington, Calif., refinery of Shell Oil Co., Inc., has been promoted to the head office at San Francisco where he will continue in his previous capacity.

Leslie Moses, for 6½ years counsel for Fohs Oil Co., Houston, Tex., was elected secretary at a recent meeting of the board of directors. Mr. Moses, a graduate of Tulane University, practiced law in New Orleans, La., 12 years before joining Fohs. He specialized in petroleum law and is the author of important articles on various phases of that subject. His monograph on "The Growth of Severance Taxation in Louisiana and Its Effect on the Oil and Gas Industry" appears in the April issue of Tulane Law Review.

Russel G. Allen, formerly manager of manufacturing operations in the Southwest for Godfrey L. Cabot, Inc., is moving to the main office in Boston, Mass., as vice president. Mr. Allen graduated from Haverford in 1923, joined the Cabot organization in



R. G. ALLEN

HUGH BURDETTE

Texas in 1925 and was employed in the Southwest and in West Virginia until he was placed in charge of the southwestern division in 1930 with headquarters at Pampa, Tex. **Hugh Burdette,** formerly eastern production manager, is moving to Pampa to the position vacated by Mr. Allen. His position will be filled by the promotion of **L. J. Morris,** who will direct operations in West Virginia, Pennsylvania and New York from the Cabot office in Charleston, W. Va. Mr. Burdette has been with Cabot since 1920 and Mr. Morris since 1922.

JACK P. HAYS

Jack P. Hays has accepted appointment as petroleum engineer for the Seaboard Oil Co. of Delaware at the company's Texas headquarters in Dallas Tex. In reentering the operating end of the industry, Mr. Hays terminates a 5-year assignment with Texas A. & M. College where he was associate professor of petroleum engineering. He is a petroleum engineering graduate from the University of California and before joining Texas A. & M. he was district petroleum engineer for the Shell Oil Co., Inc., in Louisiana and South Texas areas.

Elmer W. Pollock, cashier of the First National Bank & Trust Co., Tulsa, has been appointed vice president and assistant treasurer of Deep Rock Oil Co., also of Tulsa. He will assume his new duties June 1.

H. M. Lingle, purchasing agent for Humble Pipe Line Co., Houston, Tex., has returned to company duties after serving on special assignment as purchasing agent for the War Emergency Pipelines, Inc. **W. H. McEachern,** formerly of the Sanderson-Porter Co., has succeeded Mr. Lingle with WEP at Cincinnati, Ohio, headquarters.

Lloyd Summers, Standard Oil Co. of Venezuela, Maracaibo, Venezuela, is visiting in the United States. He has made calls in the Mid-Continent and has spent some time at New York offices of Standard Oil Co. (New Jersey). A brother, **C. S. Summers,** New York, export representative, is his host while in the East.

J. M. Roxwell, engineer for Phillips Petroleum Co., has been transferred from Bartlesville, Okla., to Wichita Falls, Tex.

Frank A. Stivers, vice president and general manager, Texas-Empire Pipe Line Co., was elected last week in a city election to become a member of the city of Tulsa school board.

Roy Wooster, of Clay City, Ill., has been named manager of drilling operations in the Rocky Mountain area by Northern Ordnance, Inc. He will make his headquarters at Shelby, Mont.

Market Developments

East Coast

NEW YORK.—The ban on pleasure driving in 12 northeastern states was reinstated last week as the break in the big-inch line sharply curtailed receipts of oil and presaged a further decline in supplies available for civilian consumption on the East Coast. Estimates of the decline in receipts as a result of the line break ranged from 100,000 to 200,000 bbl. per day. A reduction of 150,000 bbl. for the 10-day period required to repair the break would mean a total loss of 1,500,000 bbl., a serious interruption in view of the critical nature of supplies. Oil companies attempted to reroute cars to other sources of supply in an effort to minimize the effect of the loss of the Norris City terminal. At best, such efforts would hold shipments at levels existing prior to the use of Norris City which would be well below the rate of 980,326 bbl. per day attained in the week before the break.

Stringent enforcement of the ban was undertaken both by police and OPA inspectors and traffic was noticeably reduced in the metropolitan New York area. One effect of the ban will be to reduce the black market in ration coupons which was the principal factor in the excessive gasoline sales. "A" coupons were reported obtainable at 15 cents per coupon entitling the holder to the purchase of 3 gal. of gasoline. The quantities of stamps taken in arrests indicate that the black market has been very extensive. The excess gasoline demand has necessitated an increase in deliveries of this product so that the industry has been unable to accumulate heating-oil inventories.

Mid-Continent

HINTS that more drastic curtailment of motor-fuel consumption may be imposed on the Middle West were viewed this week with misgivings by Mid-Continent refiners. Most plant operators reserved critical judgment until shocks of the flood damage to railroads and high-water interference with river shipments have been more accurately appraised.

Regular rail shipments from refineries in the southern part of the Mid-Continent were bottled up for nearly 10 days, resulting in acute supply shortages in part of the Middle West territory regularly receiving products from Oklahoma. Calls for deliveries on gasoline were particularly brisk from the agricultural districts, although large areas of farm land in Missouri and Illinois were inundated.

Refiners reported that newly modified restrictions on the percentage of gasoline authorized from Mid-Continent crude runs to stills eventually will ease the tight supply situation. Temporarily, however, most plant operators are turning away potential business from contemporary manufacturers and from new customers.

Calls for tractor fuel and kerosene continue strong. Supplies of these products are limited. Refiners are considerably behind their normal schedules calling for additions to storage at this season for meeting heavier calls in the fall and winter.

All products are steady at unchanged price levels which, in most instances, are the ceiling set by OPA.

Gulf Coast

HOUSTON, Tex. — Rising strength was reported in virtually all divisions of the refinery market this week. An exception might be made in the case of No. 2 heating oil. But even though the demand for distillate fuel is not so pronounced as it was a few weeks ago, it apparently is because the appeals for other products, especially gasoline, have grown in urgency.

Strength of gasoline, which has been increasing steadily in recent weeks, continues to be conspicuous. The large companies are devoting chief attention to the manufacture of aviation grades, which the Government is absorbing as fast as they can be produced.

Major refiners are paying little attention to the open market now. Their operations and manpower are centered primarily on meeting demands of the Army and the Navy, and these demands cover the whole list of oil products. Third-grade, regular, and premium gasolines are being made by most refiners, but in the case of the big companies the lower grades go to their own bulk plants or to those of affiliated companies for distribution through their own network of service stations. Manpower shortage has become a critical problem in almost all plants, and the principal difficulty is not in finding buyers, but in keeping plants operated efficiently and moving products to the points where they are needed.

There was no relaxation this week in the demand for kerosene, scarcest product in the list. Offerings have dried up, and eastern buyers are snapping up every gallon available.

Pacific Coast

LOS ANGELES, Calif.—There was very little activity in the California refined-oil market during the week and present indications point to the probability that conditions will rock along as they are for another 60 to 90 days as nothing is anticipated to change existing conditions. OPA froze the price of Navy fuel oil at $1.265 per barrel in Los Angeles and Port San Luis and $1.315 per barrel in San Francisco which means that the price of gas oil must also be pegged inasmuch as gas oil is used as a blending agent with residual fuel to bring the product up to Navy specifications.

Fuel-oil demand during April continued at peak levels. Based on the results of business during the first 15 days of May the current month will show a similar trend.

Gasoline sales during April did not show the consistent decline that has marked operations since Pearl Harbor and for the first time the number of stations opened exceeded the number shut down.

From now on conditions should remain relatively stable with few changes to be expected. Most marketers feel the bottom has been reached as far as gasoline sales are concerned as they do not expect synthetic tires for the general public to become an important factor until 1944 and therefore travel will continue to be restricted in the meantime.

A.P.I. REFINERY REPORT

Week Ended May 15, 1943

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	156	2,526	467	780
Ind., Ill., Ky.	757	19,125	3,169	4,078
Okla., Kan., Mo.	354	6,641	1,498	1,677
Censored area*	1,713	35,498	10,794	13,257
Rockies	84	1,978	544	321
California	704	21,182	50,839	11,778
Total 5-15-43	3,768	86,950	67,311	31,891
Total 5- 8-43	3,755	88,166	67,577	31,663
Total 5-16-42	3,400	100,780	79,593	29,110

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
May 15, 1943	241,457,000
May 8, 1943 (revised)	241,856,000
May 16, 1942	254,202,000

*Excludes unrefinable California stocks.

Refinery Prices

(Prices as of May 25)

Quotations are f.o.b plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.125-6.500	6.000-6.125	5.500-6.000	5.000-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C§
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.85-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200. §Gravity range.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	§1.10-1.15
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		37.50
10 pour point		36.50
15 pour point		35.50
25 pour point		30.00
200 vis. at 70° F., 3 color:		
Zero pour point		39.50
10 pour point		38.50
15 pour point		37.50
25 pour point		32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND
(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.90	5.50	10.20
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.30
Hartford, Conn.	15.60	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.95
Pittsburgh, Pa.	16.70	5.50	12.30
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.30
Average 14 cities	16.02	5.14	10.85

(All prices undivided dealer basis.)

CENTRAL
(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN
(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	.....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10.49

*Includes 1-cent state tax.
†Includes ½-cent state tax.

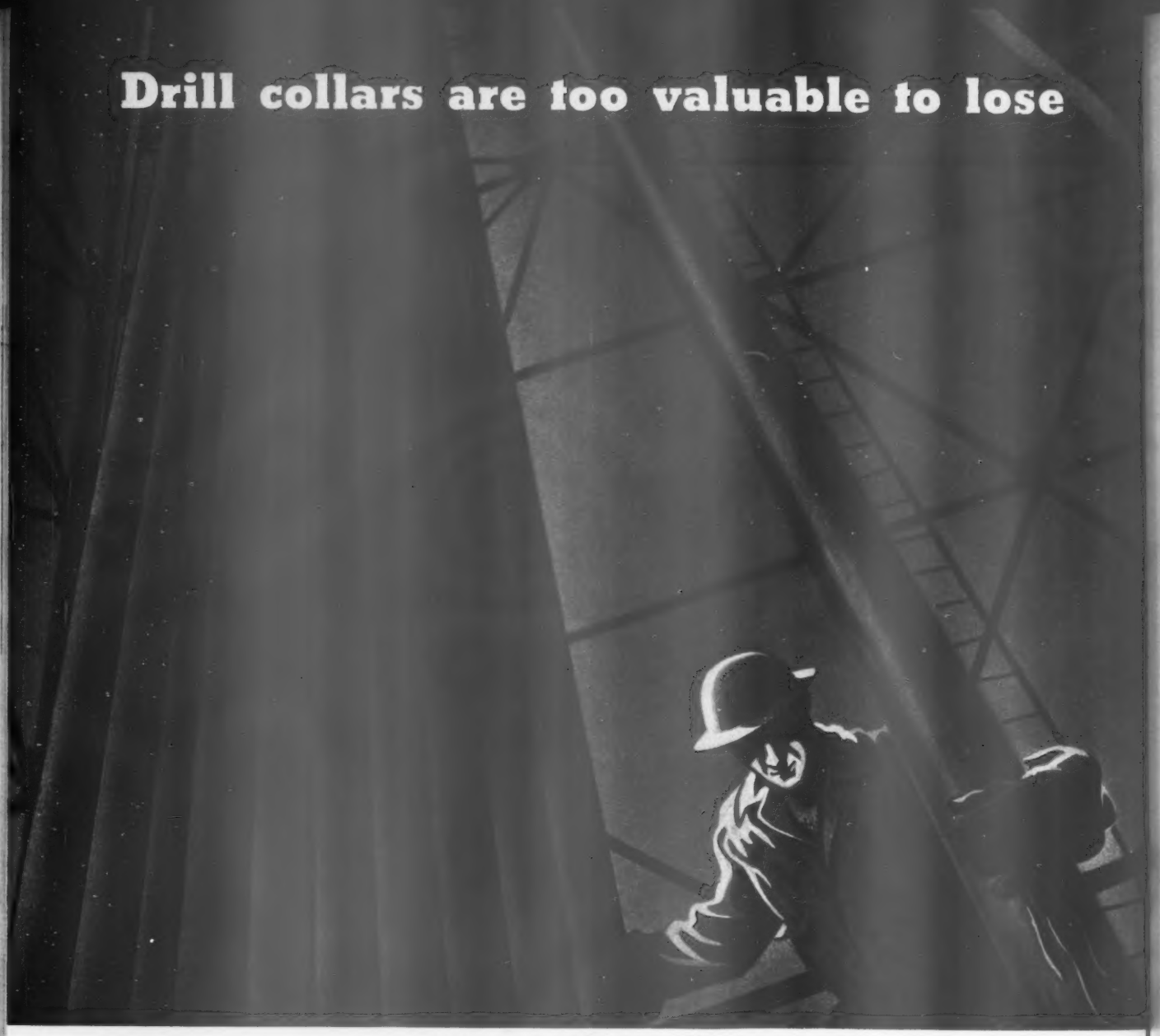
MIDWESTERN
(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST
(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.80
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.80
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.55	5.96	10.87

Drill collars are too valuable to lose



Information supplied by "Oil and Gas Journal"

The economic question of whether it is cheaper to leave lost drill collars in the hole and start over, or spend a lot of time and money to fish them out is no longer even academically interesting.

Today no amount of time and effort is too much if the collars are recovered. They are practically irreplaceable, and their loss can cripple a rig permanently. Consequently the best motto in the case of trouble is "never say die."

This is borne out by an actual case. The pipe was stuck 4,000 feet from bottom in a 9,500-foot hole. Ten days' work failed to free it, so it was decided to cut it off above the drill collars, drive the collars to the bottom and recover them.

The attempt to cut the pipe also failed, so it was decided to twist it off. During the attempt the entire drill stem came free, and was easily pulled out of the hole.

Naturally there are no hard and fast rules for the conduct of fishing jobs, either as to equipment or method. Two things will help; perseverance and an organized plan of procedure.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company
500 Fifth Avenue • New York City

MOLY

Equipment Progress

Bantam Bearings Corp. Becomes Division of Torrington Co.

Bantam Bearings Corp., South Bend, Ind., a subsidiary of Torrington Co., of Torrington, Conn., for the past 8 years, has been merged with its parent company and will henceforth be known as Torrington Co., Bantam Bearings Division. The Bantam Division will retain its present personnel and continue its operations from the South Bend headquarters.

The merger makes available to industry, from a single company, an unusually diversified line of antifriction bearings. Bantam produces all of the major types with special emphasis on custom-built bearings in the larger sizes up to 12 ft. in diameter. In addition, the combined facilities of Bantam and Torrington provide the manufacture of a complete range of needle bearings from a unified source.

C. H. Talcott, sales manager of Torrington's bearing division, will continue to direct sales of the Torrington needle bearing. Ray Nichols, vice president and general manager of Bantam, will be in charge of the Bantam Division's operations while sales of needle rollers, quill bearings and other standard and special bearings will be continued under the direction of J. F. Oehlhoffen, sales manager of the Bantam Division.

Asbestos Cement Conduit With New Flexible Coupling

Many superior advantages are claimed for a new asbestos cement conduit, intended principally for cable installation, now produced by Philip Carey Mfg. Co., Lockland, Cincinnati, Ohio. An outstanding feature of the conduit is the exclusive "Flexcaulk" coupling, made expressly for and supplied together with the conduit.

Flexcaulk coupling consists of a tubular housing of tough, rigid, blow-resisting asbestos-cement, to which is bonded a liner of time-resisting mineralized asphalt compound, formed into a barrier-type, tapered liner. Because of its special construction, Flexcaulk coupling adds a new flexibility without sacrificing any of the desirable characteristics of a conventional-type coupling of unusual strength. It permits a flexible, self-aligning, water-tight joint of exceptional quality, when properly assembled with a special, joint-sealing compound.

Because Flexcaulk coupling is employed with nontaper type conduit, the field assembly of short lengths of complete duct runs, or the fabrication of radius sweeps for clearing fixed obstructions, becomes a simple, inexpensive job.

The conduit is made in two thicknesses, for installation with or without concrete encasement. It is assembled rapidly and cheaply, and easily cut on the job. Only unskilled labor and simple tools are required.

Layne & Bowler Designs High-Capacity Vertical Turbine Pump Bowls

Layne & Bowler, Inc., Memphis, Tenn., recently has designed and developed a line of high-capacity vertical turbine pump bowls. These bowls are intended primarily for pumping water from flowing streams or lakes for war plants, but may be used in large-diameter wells for industrial or municipal water supplies.

The Memphis factory recently has fabricated five complete pumping units for a synthetic-rubber plant. These units are equipped with the new two-stage 30-in. Type SKHC bowls, designed to deliver 11,000 gal. per minute against a total dynamic head of 169 ft. and are driven by 500-hp., vertical, hollow-shaft motors. They will be installed in a large-diameter caisson and pump water from a flowing stream.

Another lot of 15 complete pumps, also for a synthetic-rubber plant, will have newly developed 36-in. Type RKMC, single-stage bowls. The capacity range will be from 11,000 to 14,600 gal. per minute, and the pumps will be driven by 500-hp., vertical, hollow-shaft, synchronous motors.

This new line of high-capacity, large-diameter bowls includes designs for capacities up to 16,000 gal. per minute, and all bowls are true turbine type. Noteworthy features are the unusually high efficiencies throughout a wide capacity range and the nonoverloading-type impellers used. These features make the new bowls especially desirable for pumping from rivers or streams where fluctuating water levels are encountered, with consequent variation in capacities and pumping heads.

Awarded Army-Navy "E"

The Army-Navy production award, recognizing exceptional performance in supplying war material, was formally presented to the men and women of American Cast Iron Pipe Co., Birmingham, Ala., March 24. Presentation ceremonies were held in the service building auditorium at Acipco, and an elaborate program was prepared for the occasion.

Buys Rights on Cathodic Process

Johnston & Jennings Co., 864 Addison Road, Cleveland, Ohio, manufacturer of Oceco tank fittings and Stowe industrial stokers, has purchased the exclusive manufacturing and sales rights of Rusta-Restor, a cathodic (i.e., electrical) process for preventing rusting of water tanks, piping and similar steel structures, which has been tested and approved by the American Water Works Association, Factory Mutual, and other laboratories.

"E" Award to Lufkin

Lufkin Rule Co., Saginaw, Mich., has been awarded the "E" for excellence in the production of war material.

Practically every article in the present Lufkin line is used in war work. Precision tools are used throughout metal-working plants, as well as in testing, servicing and repairing of motors, machinery and other equipment, while measuring tapes, tape rules and folding rules are employed in engineering, construction, production and maintenance work on both the home and fighting fronts.

Trade Literature

International Nickel Co., 67 Wall Street, New York City.—A new booklet describes four different methods for renewing worn metal parts such as pump rods and shafts. Using a worn pump shaft as practical example, the booklet explains and illustrates the step by step procedures for reconditioning the shaft: by machining and refinishing worn section; by building up and refinishing the section by welding, by metal spraying, and by heavy and hard electrodeposition.

Leeds & Northrup Co., 4934 Stenton Avenue, Philadelphia, Pa.—Catalog N-OOB, Micromax Pneumatic Control,

stresses the use of this equipment for regulation of pH, conductivity and other conditions, as well as temperature. The Micromax controller is described as completely factory-assembled, ready to be connected to valve, to thermocouple or other primary element, and to electric power.

Western Precipitation Corp., 1041 West Ninth Street, Los Angeles, Calif.—A booklet entitled "Catalyst Recovery," which contains much valuable information on the recovery of catalyst in the catalytic refining process. It discusses the important phases of catalytic recovery, the types of equipment best suited to each phase, and their methods of operation.

Leland Equip. Co. Moves To Larger Quarters

Announcement has been made by Harold R. Downs, president, Leland Equipment Co., of the removal of the offices, warehouse and shops of the company to larger and more conveniently located quarters at 105 North Boulder, in Tulsa. This company was established in 1925 primarily to sell and service truck equipment. Later several construction machinery lines were added and a special unit established to manufacture heavy trailers.

In more recent years the number of manufacturers represented has been increased and now a complete line of industrial equipment and supplies is available to contractors and oil operators in the area served by offices and warehouses established in Tulsa, Oklahoma City and Longview, Tex.

Besides the heavy equipment lines carried for many years, the company has now added equipment to make endless belting and carries stocks of V belts, chain and other transmission supplies.

The new Tulsa plant provides much needed space for an enlarged personnel, which has grown from a few salesmen and clerks to a force of 45 employes.

Dowell Opens Offices in New York and Cleveland

Dowell Incorporated has established a new district on the Atlantic Coast with offices at 30 Rockefeller Plaza, New York City. S. C. Morian, formerly of Dowell's Houston office, is district manager. A treating station has been established at Riverdale, with M. M. Dewitt formerly of the research department at Tulsa, in charge.

An office has also been established at Cleveland, Ohio, with F. I. McConnell, formerly in Dowell's Fort Worth, Tex., office, in charge. T. B. Greer has been transferred from Salem, Ill., to the Cleveland office.

These offices have been opened to handle rapidly expanding industrial cleaning operations. From these stations, chemical treatments for the removal of water-deposited scale from all types of heat-exchange surfaces and other scaled-over equipment will be carried on.

PITTSBURGH STEEL GETS TWO-PLANT "E" AWARD

In separate ceremonies, Army-Navy "E" recognition was granted to both the Allenport and Monessen, Pa., plants of Pittsburgh Steel Co., conferring the unusual honor of a two-plant award to one company in a single day.

Lt. Col. Ralph L. Dunckel, deputy chief, industrial division, Pittsburgh ordnance district, presented the "E" flags which were accepted for the company by E. J. Protin, operating vice president. Comdr. Carl E. Egeler, in charge of naval inspection, Munhall-Pittsburgh area, awarded token lapel "E" pins to representative employes of the company. At Allenport, Benjamin F. Nichols, president, Local 1187, U.S.A.-C.I.O., accepted for the employes; at Monessen, Stephen Wisyanski, president, Local 1229, U.S.A.-C.I.O., responded for the employes. Officers of the Army and Navy, officials of the company, and thousands of employes participated in the ceremonies conducted by George Heid, M.C., pledging continued production support to the more than 2,000 Pittsburgh Steel men in the nation's armed forces.

Lt. Col. Ralph L. Dunckel, deputy chief, industrial division, Pittsburgh Ordnance division; P. E. Sance, works manager, seamless tube division; Joseph H. Carter, president; Henry A. Roemer, chairman of board; E. J. Protin, operating vice president, and Comdr. Carl E. Egeler, U.S.N.R., Naval Inspection, Munhall-Pittsburgh

Among Equipment Men

Harrington Joins Hunt Tool Co. as Vice President

George G. Harrington has become a member of the firm of Hunt Tool Co., Inc., of Houston, Tex., effective May 15, and was elected vice president in charge of engineering and research. He also was elected a member of the board of directors.

Following 19 years of service in the engineering department of Reed Roller Bit Co., the last 11 years of which he was chief engineer, Mr. Harrington recently opened a consulting engineering office in Houston. He is a graduate in engineering from University of Texas with the degree of bachelor of science in mechanical engineering, is a member of Tau Beta Pi engineering fraternity and an honorary member of the mechanical engineering fraternity Pi Tau Sigma. He is chairman of the Texas chapter of the American Society for Metals.

Smith Joins DeHydro Co.

Warner A. Smith, formerly with Shell Oil Co., Inc., at Sulphur Bluff, Tex., and later with Crude Oil Contracting Co. of Tulsa, has been made service engineer for DeHydro Co. in the East Texas district, with headquarters at Kilgore.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED RATE

8 CENTS A WORD, minimum charge $2 per insertion.

SITUATIONS WANTED, 4 cents a word, minimum charge $1.

BOX NUMBERS, count 9 words when replies are to be sent to our Tulsa Office.

10% DISCOUNT if 3 insertions are ordered at one time, with check accompanying order.

Classified display advertising set in single or double column style:

DISPLAYED—PER INCH

Classified display advertising set in single or double column style:

1 inch	1 time	$7.00
1 inch	13 times	6.50
1 inch	26 times	6.00
1 inch	39 times	5.50
1 inch	52 times	5.00

Rates are governed by total space used within 12 months from date of first insertion. Credits are allowed when lower rates are earned.

FORMS CLOSE MONDAY NOON—PUBLISHED EACH THURSDAY

HELP WANTED

INSTRUMENT Maintenance Men wanted. Preferably with oil refinery experience. Acquainted with Foxboro, L & N, Taylor, and Mason-Nielan instruments and controls. For new plant being built, location Texas Gulf Coast. Send photograph and complete experience record. Men now employed in war industries not considered. Box B-561 The Oil and Gas Journal, Tulsa, Okla.

WANTED: Sales Manager, general steel plate, structural, and allied fabrication—Middlewest. Must have engineering background, also executive and organizing ability. Write giving age, education, experience, salary, and references. Box B-635, The Oil and Gas Journal, Tulsa, Okla.

EXPERIENCED REFINERY MEN

Operators, chemists, stillmen, maintenance superintendents or foremen, instrument men, electrical and mechanical engineers. Such men can be immediately employed at a 100-octane aviation plant now under construction in Oklahoma and placed in good operating positions in the refinery when completed.

New Equipment—New Methods
Free Schooling
A REAL OPPORTUNITY

State education, complete experience, and salary desired.

P.O. Box 2007, Tulsa, Oklahoma

Essential worker applicant must have Manpower Commission certificate of availability.

REFINERY EQUIPMENT MANUFACTURER

requires the services of man experienced in fabrication of heat exchangers and pressure vessels for supervisory position. Must know shop practices. Reply giving full details of qualifications. Box B-621, The Oil and Gas Journal, Tulsa, Okla. Applications from those now employed in war industries will not be considered.

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

HELP WANTED

PETROLEUM ANALYST

To analyze present and future markets for post war planning. Must have knowledge of oil industry including drilling and refining equipment, prospective new fields, all existing refineries and oil fields. Box B-630, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST, with major company experience. Good position for right man with a small but financially strong company. In reply state age, draft status, and salary expected. Reply strictly confidential. Box B-632, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Sales Manager, general steel plate and structural products—Gulf States. Write giving full information, experience, salary. Box B-634, The Oil and Gas Journal, Tulsa, Okla.

WANTED—CONSTRUCTION SUPERINTENDENT

Must be thoroughly familiar with refinery construction, high type, preferably college education. Good opportunity for right man. Give age, draft status, experience, references, salary expected and availability in first letter. All replies confidential. Reply to The Oil and Gas Journal, Box G-1, 105 West Madison Street, Chicago, Ill.

SITUATIONS WANTED

EXECUTIVE ACCOUNTANT

Desires permanent position as comptroller or executive accountant of substantial concern. Fifteen years diversified experience in industrial, oil, and public accounting. Considerable system, cost, and tax work. Age 42. Box B-620, The Oil and Gas Journal, Tulsa, Okla.

INCOME TAX CONSULTANT-ECONOMIST: 20 years executive, public accounting firm—admitted to practice before Treasury Department and several State Tax Commissions. Unusual broad experience business organization—economics—and operations. Now employed. Desire to obviate travel. Just beyond draft age—married—family. Will leave state. P.O. Box 1953, Dallas, Texas.

SITUATIONS WANTED

PRODUCTION FOREMAN, twenty-three years' experience, flush and settled production, sand or lime formation, 300 ft. to 6500 ft. Age 43, family, class 3A(H). Immediately available. Box B-623, The Oil and Gas Journal, Tulsa, Okla.

OIL STATISTICIAN
TAX ACCOUNTANT
EXECUTIVE

Now employed as Secretary-Treasurer, oil producing company. Desire change of my own volition. Familiar with Federal and States Taxes, including Income, Declared Value Excess Profit Taxes, all Governmental and State reports pertaining to oil industry. Reorganizations under Federal Chandler Act, systems and accounting procedure, Production, Pipe Lines and Refinery branches, as well as Joint Interest ventures. Public Accounting experience. Desire permanent connection with substantial concern. Age 44, draft exempt. Post Office Box No. 2991, Dallas, Texas.

GEOLOGIST: Twelve years experience in Texas and Oklahoma. Want job with headquarters in North Texas or Oklahoma. Class 3 Draft Classification. Married, one child. Box B-633, The Oil and Gas Journal, Tulsa, Okla.

PETROLEUM SALES ENGINEER available. Thoroughly familiar with petroleum jobber and automotive fleet operations. Eighteen years responsible background with Pennsylvania Refiner over wide area including Personnel, Distribution, Warehousing and Transportation problems. Some accounting. At present District Manager closely allied industry in Southwest. Age 42. 4-H Classification, Married. Box B-631, The Oil and Gas Journal, Tulsa, Okla.

PROCESS ENGINEER with 21 years experience in design, construction and operation of latest developments in casinghead plants and oil refineries, desires connection with refiner or manufacturer of refinery equipment. Box B-636, The Oil and Gas Journal, Tulsa, Okla.

ELECTRICIAN and Instrument man 12 years one refinery, 5 years steel mill maintenance and construction. Will go anywhere—foreign if possible. Box B-611, The Oil and Gas Journal, Tulsa, Okla.

EXPLORATION

TORSION BALANCE geophysical surveys contracted. Very reasonable rates. Modern instruments, experienced, capable, torsion balance field personnel. Expert interpretations. Address: Christian Iden, Geophysicist, Box 1589, Willis, Texas, or 1740 Commerce Bldg., Houston, Texas.

LEASES AND DRILLING BLOCKS

NEW MEXICO
State Oil and Gas Leases

Forty acres and multiples thereof, in a new HoT spot, 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, N. M.

OPERATORS: We have large structure cored to gas, completed geological, geophysical, geochemical work indicates production, 2800' drill. Will farm favorable terms. S. W. Pressey, Pueblo, Colo.

10,000 ACRE oil and gas leases, Holt County, Nebraska. National Rig on location. Need help to develop. L. R. Winn, 2001 West 2nd, Sioux City, Iowa.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois.

20 Years' Experience

Inquiries Invited.

B. D. BUCKLEY

60 Broadview Drive, Clayton St. Louis, Mo.

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Journalisms:

THE progress made so far during the war in refinery engineering has far exceeded the advances made during the period of World War 1 when the cracking process had barely been considered. Giant new plants have been erected for the manufacture of synthetic rubber and 100-octane aviation fuel. Greater flexibility has been obtained in varying the yield of what has been considered the normal products. Naturally, few of the details can yet be told but members of the Journal's editorial staff are visiting the giant new plants which are keeping the armed forces on the move. What they are seeing will be reported in the issues of June 3 and subsequent weeks.

THERE is considerable discussion of the difficulties of refining sour crude from West Texas and, at the same time, there is the certainty that the nation's refiners will have to refine more of it as time goes on. How one East Coast refinery tackled and solved the problem is the subject of a staff article in next week's Engineering and Operating Section.

ANOTHER article, based on cooperative research by leading refinery chemists of Standard Oil Development Co. and Esso Laboratories at Baton Rouge, La., and Elizabeth, N. J., describes a fluid catalyst cracking plant and shows how the process may be varied so as to provide fuels with a wide range of octane numbers as desired.

ALSO in next week's Engineering and Operating Section, George D. Kish, engineer for Dresser Manufacturing Co., describes a method for testing the elasticity of synthetic rubbers at low temperatures. The testing equipment, known as an Elastensometer, is fully described and sample tests show the wide range of temperatures below which embrittlement of different types of synthetic rubber occurs.

SHALLOW sands in the North Texas district have been repressured and flooded successfully. In many instances repressuring is undertaken first with an increase in recovery of about 50 per cent. Later water flooding on these leases has added another 50 per cent to this yield. One group of projects which use water from shallow sands which requires little treatment is described in a staff article in next week's Engineering and Operating Section.

A RECENT paper on discovery thinking by one of the country's leading geologists has aroused much interest. How this can be furthered by a system of classifying sedimentary rocks is the subject of an article scheduled for next week's Exploration and Drilling Section.

CALENDAR

June

SOCIETY OF AUTOMOTIVE ENGINEERS, diesel engine and fuels and lubricants meeting, Carter Hotel, Cleveland, Ohio, June 2-3.

PENNSYLVANIA GRADE CRUDE OIL ASSOCIATION, twentieth annual meeting, Pittsburgh, Pa., June 25.

September

AMERICAN CHEMICAL SOCIETY, petroleum division, fall meeting, Septemper 6-10. Place of meeting not yet determined.